

ays How Much and Why:

AMERICAN

AVIATION

September 1958

The Inside Story on
How This Association
Powers World Airlines p. 57



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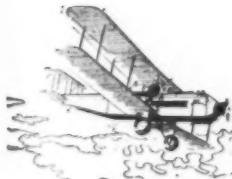
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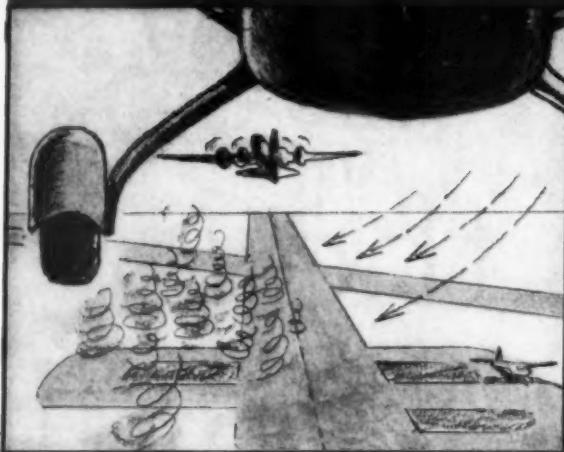
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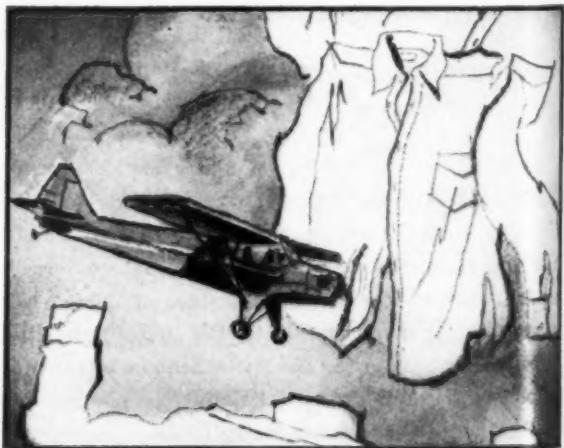


WING TIPS



PROP WASH. As you know, when the giant four-engine planes of today take off, they create tremendous air turbulence, or prop wash. You're well aware of the havoc this can cause small planes, if you've ever tried to land one on the same strip, under these conditions. Suggestion: to be on the safe side... come in on the windward — or clear — side of the strip.

SKY WATCH. Everybody knows that boredom causes accidents. Since this is particularly critical in the air, it's a wise pilot — no matter how experienced he may be — who makes a constant effort to keep alert: checks his instruments frequently, studies the sky for weather clues and other aircraft. When accompanied by others, it pays to organize a sky watch.



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WHITE ISN'T RIGHT. Did you know that light-colored shirts reflecting in the windshield, particularly at night, can give the illusion of clouds? With air lanes as crowded and fast-moving as they are today, it's a good idea not to wear anything in the cockpit which might interfere with vision. Therefore: white just isn't right!

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AMERICAN AVIATION

AMERICAN AVIATION

SEPTEMBER 8, 1958—VOL. 22, No. 8

WORLD'S LARGEST AVIATION PUBLISHERS

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SEPTEMBER 8, 1958



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WESTERN AIRLINES

AMERICAN AVIATION

FAA Is a Forward Step, But—

The new Federal Aviation Agency was created in record time because of a series of mid-air collisions.

But the mere changing of a name from CAA to FAA isn't going to cure anything.

We believe the new FAA is a fine forward step. For the first time the mechanics for joint military-civil control and operation of the airspace are available.

The tools, in other words, have now been provided by Congress and the executive department.

But tools are of no value without capable, skilled and understanding hands and brains to use them. And this is where the new FAA faces its biggest crisis at the very start.

FAA was created to solve the traffic control problem of the nation's airways. The most recent CAA budget revealed that 51% of its funds were for traffic control operations.

And yet, let's face this startling fact: Airways traffic control occupies a seat so far to the rear in CAA (and soon FAA) management and policy direction and guidance that a major upheaval is going to be necessary to move it out of a third balcony participation in what's going on.

In twenty years the only upgrading of air traffic control came during the late Charles Lowen's administration when he pulled it out of airways engineering where it was a minor division, and elevated it to a program office level. Lowen's deputy and successor, James T. Pyle, was in full accord with this much needed lift. But that isn't enough.

The reason for air traffic control's lagging position in CAA is not hard to find. Twenty years ago the major functions of CAA were airline inspection, licensing of airmen and aircraft, and the construction of intermediate fields, beacons, lights and radio ranges. Air traffic control didn't then exist as a problem.

So through the years, government seniority practices being what they are, top CAA jobs—the jobs that mean policy, guidance, management—have been filled from the ranks mostly by air carrier inspectors and airways engineering.

We doubt very much if Congress realized when it rushed through the FAA legislation that in all of the CAA there is not one single air traffic control man in a single one of the top three positions in all of the CAA regions. Nor that the only air traffic control expert in the main offices, capable but quiet Dave Thomas, has an exceedingly small role in the inner councils which establish and guide CAA policy.

Here we have a touchy situation which should give the Administration food for thought. Every high official has talked about the urgency of air traffic control. Over half of the CAA budget is devoted to that activity. Yet air traffic control is hardly to be found anywhere in the work experience of the top echelons who run, control and manage CAA. The fact is that most top CAA men have only hearsay ideas—really—about actual day-to-day air traffic control problems.

Can the new head of FAA overcome this bureaucratic system? It isn't easy. And it isn't a new one in any government organization where seniority, not experience or ability, pre-determines the top jobs. But let there be more mid-air collisions after FAA gets underway and Congress will get tough. Somehow, some way, FAA must find a way to elevate air traffic control and the people who know the problems to their rightful status as the most important single civil aviation project in the United States. We don't envy the man who has to do this job, but we envy even less the man who doesn't.

Brashness Personified

An extraordinary and unreasonable request has been made to the United States by the government-owned Australian carrier, Qantas Empire Airways. If granted, it would establish a precedent with drastic consequences.

Qantas is one of the world's fine airlines. When it asked the U.S. two years ago to establish an alternate route to London from Sydney through the U.S., the request was granted. Normally such a routing would have been via San Francisco to a Canadian city and thence to London, but Qantas was adamant in demanding both San Francisco and New York. American domestic carriers opposed the right of Qantas to originate eastbound international traffic in San Francisco, or westbound traffic in New York, but under a liberal interpretation of international agreements, the Qantas request was in order—and granted.

But now Qantas is asking the world, the moon and a few other items which all other countries—including Australia—promptly deny to all applicants. Qantas says it has the right to originate traffic in San Francisco, deliver it to New York and transfer it there to another carrier if the destination is not London but Bermuda, South America or some other place. This brashly amazing concept would put an Australian carrier in direct domestic business in the U.S. against domestic carriers.

Apply this principle to the score or more of other foreign carriers now serving points within the U.S., and the whole concept of international carriage would be blasted to the complete detriment of American domestic carriers. Not only is the Aussie request entirely at variance with the reasons set forth for its original route request, but we suspect that it has taken this wild dice throw chiefly because it found the State Department and CAB handling of international manners so insipid, inconsistent and bumbling that it had a gambler's chance of winning. But we are surprised and sorry that it took that chance—it was beneath the stature and fair play for which Australians are generally known.

Wayne W. Parish

LETTERS

Analysis of Airspace Problems

With reference to "AMB Begins Fight Against Airspace Slums" (AMERICAN AVIATION, Aug. 11, p. 19) the point is well-taken that in order to make an accurate analysis of national air traffic patterns and rates of growth, the country may be usefully segmented into sub-areas. It is essential, however, that these sub-areas have a direct relationship to the problem being studied. The definition of these areas in terms of the range of "VHF radio aids, radar, etc.," as suggested by AMB does not fulfill this requirement.

In order to see this point more clearly, consider the categories of air traffic. For purposes of the AMB study, the volume and pattern of military traffic may be taken as given. That is, the volume, pattern, and type of traffic, and the resulting requirements in number and types of navigational aids, landing facilities, and supporting facilities are determined by national security requirements. These should be obtained from Air Force estimates.

On the other hand, the projected volume and patterns of air carrier and general aviation traffic will require a detailed economic analysis. It is here, particularly, that the AMB concept of analysis breaks down.

It is recognized by aviation experts that the "air trade market" approach to air traffic predictions will yield the most logical and reliable results of any technique currently utilized. This approach is simple in concept and rests on the fact that the elements affecting air traffic generation in the sphere of air carrier and general aviation are basically economic.

The first point in this approach recognizes the existence of an "air trade area." This is a geographic area within which the demand for air carrier and general aviation services flows toward one particular airport (or group of airports in the case of densely populated areas such as Chicago, New York, etc.). This area will tend to be octagonal in shape, though the specific con-

figuration of any given area will depend on such geographic features as lakes, mountains, etc.; and on man-made features, including highways, cities, etc. These areas will not be uniform in size but will vary with population density, ease and rapidity of surface transportation, and general economic characteristics of the area.

The second point in this air trade area approach is that the volume of air carrier and general aviation traffic generated by one of these areas is directly related, in a determinable way, to the population and economic characteristics of the area, while the size and change of population in any one of these areas is, again, directly determined by the area's economic growth.

For example, the principal factors determining the growth of air carrier and general aviation traffic between Chicago and Detroit are: the growing industrialization of these areas, with the resulting increase in population; the rise in corporation profits; and the rise in spendable income of people within the population.

By using the air trade area concept, it is possible to project future air traffic between the Detroit and Chicago air trade areas on the basis of their economic and population growth. However, using the concept suggested by AMB it may be seen from a map that the "cell" which covers Chicago covers Detroit also, as well as South Bend, Indianapolis, Dayton, Toledo, Grand Rapids, Muskegon and Flint. Each of these cities is the center of an economic air trade market important in its own right. Moreover, all of these cities have important volumes of air traffic with one another. And note, finally, that this arbitrary "cell" technique proposed by AMB excludes some densely populated areas which generate substantial traffic at the cities mentioned (e.g., the southwest side of Chicago).

Once the volume of air traffic flow between air trade areas has been determined, it is relatively easy to determine the type, number and location of physical facilities required to handle the projected volume of traffic.

Finally, it should be noted that this concept of air traffic measurement is not new and unproven. The general technique was illustrated to the 1957 Airport Operators' Council Convention in Chicago, and has been used for many years by the airport consulting firm of Leigh Fisher and Associates, with notable success. Moreover, the technique has been found adaptable to both large and small air trade areas in this country and abroad.

These few paragraphs are in no sense a complete description of the air trade area technique of traffic forecasting. They are only intended to indicate an approach which is intimately related to the problem, and which consequently has a logic missing in the suggested AMB approach.

Paul K. Dycen
QM Test Activity
Hq BAMC
Fort Sam Houston, Tex.

Doesn't Agree With Saint

Sam Saint (AMERICAN AVIATION, July 28, p. 47) suffers from seeing traffic control through his own narrow point of view. He also groups together "certain military and private flying interests" which are in fact at opposite extremes.

Military "jets," when crossing airways, should observe CAA regulations. There is no reason why these regulations cannot be enforced, when there are transport aircraft. If these were designed with something more than just a narrow slit for the pilots to attempt to see through, collisions and near-collisions would be much less frequent.

And pilots will have to learn to look outside, at other times than just take-off and landing.

In the same issue (p. 61) this is stated another way, i.e. that the only method available on transport aircraft to even begin to adequately see what they are flying through, is to make 45-degree turns on the way down.

No!—Give the pilots one more set of black boxes to fiddle with, and windows in cockpits will be unnecessary. Ah, progress! Always more complication, never simplification, although I suppose getting rid of windows for pilots' cockpits might be considered a simplification.

George B. Collinge
Sepulveda, Calif.

EDITOR'S NOTE—Jet flying machines will converge at speeds up to and over 1,000 miles an hour. At the altitudes normally flown by jets, pilots—even conscientious pilots—watching for traffic will tend to go into a stare with eyes focused only a few feet in front of the windshield. At the higher speeds pilots will spend a much higher percentage of time looking at maps and tuning radios. Studies of eye-scanning capabilities have concluded that the probability of a pilot's seeing the other aircraft in time can be as low as 50%—even in jet fighters where the pilot sits in a clear view canopy. To a careful thinker these facts permit of only

AMERICAN AVIATION offers these columns to readers for expression of opinion and criticism on the editorial content of this magazine and/or happenings in the aviation industry. Address such correspondence to Joseph S. Murphy, Executive Editor, American Aviation, 1001 Vermont Ave., Washington 5, D.C. Anonymous letters will not be printed; however, names will be withheld on request.

one "narrow" interpretation: Aircraft in this category must operate under "positive control" on tracks kept clear of all uncontrolled traffic. The question is not whether we should have positive control. That question has been decided at a large cost in lives. The big question now is: Will these faster aircraft be allowed to operate outside of positively controlled airspace?

ICAO Not IATA

HAPPY TO SEE THAT TEXT OF YOUR AIRTRENDS NOTE ABOUT IATA'S CONTROVERSIAL STUDY OF JET IMPLICATIONS (AMERICAN AVIATION, AUG. 25, P. 53) MAKES IT QUITE CLEAR THAT IT WAS IN FACT ICAO'S BABY.

S. RALPH COHEN
IATA

When & Where

SEPTEMBER

Air Cargo, Inc., air freight carriage conference, Hotel Sherman, Chicago, Sept. 9-10.
American Rocket Society, fall meeting, Hotel Statler, Detroit, Sept. 14-18.
American Petroleum Institute, Aviation Technical Service and Aviation Advisory Committee joint meeting, Melrose Hotel, Dallas, Sept. 15-17.
Instrument Society of America, annual instrument automation conference and exhibit, Convention Hall, Philadelphia, Sept. 15-19.
National Business Aircraft Assn., annual meeting, Bellevue-Stratford Hotel, Philadelphia, Sept. 22-24.
National Assn. of State Aviation Officials, meeting, Bellevue-Stratford Hotel, Philadelphia, Sept. 24-26.
American Helicopter Society, annual western forum, Ambassador Hotel, Los Angeles, Sept. 25-27.
Air Force Assn., annual convention and air-power panorama, Dallas, Tex., Sept. 25-28.
SAE aeronautic meeting and aircraft production forum, Ambassador Hotel, Los Angeles, Sept. 29-Oct. 3.

OCTOBER

Champion Spark Plug Co.'s distributor and executive operators clinic, Secor Hotel, Toledo, Oct. 6-7.
Canadian Aeronautical Institute—IAS, joint meeting, Chateau Laurier, Ottawa, Oct. 7-8.
Champion Spark Plug Co.'s annual aviation spark plug and ignition conference, Secor Hotel, Toledo, Oct. 8-10.
Armour Research Foundation and Illinois Institute of Technology annual noise abatement symposium, Hotel Sherman, Chicago, Oct. 9-10.
Air Mail Pioneers 40th anniversary Ball, Beverly Hilton Hotel, Beverly Hills, Calif., Oct. 10.
Annual New York State airport development and operations conference, Onondaga Hotel, Syracuse, N.Y., Oct. 14.
Annual Indiana aviation conference, Turkey State Park, Ind., Oct. 15-17.
Annual symposium on aviation medicine, Palmer Hotel, Santa Monica, Calif., Oct. 24.
International sports car and light plane exhibition, International amphitheater, Chicago, 24-Nov. 2.
International Air Transport Assn., annual general meeting, New Delhi, Oct. 27.
10th East Coast aeronautical and navigational electronics conference, Lord Baltimore Hotel and 7th Regiment Armoury, Baltimore, Oct. 29.

NOVEMBER

Airline Distributors and Manufacturers Assn., meeting, Dallas, Tex., Nov. 18-20.
International Air Transport Assn., public relations conference, Hamburg, Germany, Nov. 24-27.

DECEMBER

American Rocket Society, annual meeting, Hotel Statler, New York City, Dec. 1-5.
Aerospace Electronics Engineering Committee meeting, Hotel Statler, Washington, D.C., Dec. 2-4.

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CONVAIR

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540 TURBO-PROOF

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- By special arrangement, Convair has transferred to Canadair all "440" tooling to start new "540" production line.
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- Low operating costs make it profitable on moderate density routes . . . has 8% more seats than "440's" in standard configuration.
- Operational flexibility: uses any moderate size airport . . . has a range of 1500 miles with 2 hrs. fuel reserves . . . climbs quickly (1400 fpm) to smooth cruise altitudes of 15-20,000 ft.
- "Eland-6" engines provide wide speed range . . . overhauls at long periods . . . sectionalized design for easier maintenance. Each engine develops 3500 eshp at take-off, allowing increase of 4100 lbs. over "440" in max gross weight. Cruise speed 325 mph at 20,000 ft.
- Aircraft is in production for the Royal Canadian Air Force . . . first deliveries, July, 1959.

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IN BRIEF

Used transport pricing will dramatically affect foreign sales potential, according to an Air Force market study completed almost 12 months ago but only now made public. USAF project, conducted by United Research, Inc. (formerly Aeronautical Research Foundation) of Cambridge, Mass., shows demand for surplus military medium transports could jump from 61 at mid-1957 commercial prices to 282 if price is dropped to 25% of that value. Market at half price would be 149 aircraft.

Here's how USAF study breaks down medium transport demand by world area based on information from overseas CAA offices:

Area	At Mid-'57	At % of Mid-'57		
		price	75%	50%
So. America	61	67	128	249
Cen. America	0	5	10	17
Middle East	0	6	6	6
Far East	0	5	5	10
Total	61	83	149	282

Market for medium-large transports drops to a total of 41 even at 25% of mid-1957 price. Of these South America would account for 32, or 78%. Large transport market drops to only 12 aircraft with the 75% discount.

Enlarging its forecast to include the period 1958 through 1962, United Research forecasts this overall area demand for medium and medium-large used transports:

Area	Medium-	
	Medium	large
So. America	246	7
Cen. America	57	3
Middle East	13	5
Africa	12	7
Far East	70	12
Australia/New Zealand	23	3
Western Europe	..	..
Canada	11	9
Total	423	46

All-out attack by Navy on jet ground noise brought contracts totaling \$1,380,916 to five firms for some 132 portable sound suppressors. Companies and their respective dollar awards were Metal Products

Div., Koppers Co., Baltimore (\$359,950); Curtiss-Wright Corp., South Bend (\$328,800); International Aerocoustics, New York (\$309,216); Maxim Silencer Co., Hartford (\$286,200); and, General Sound Control, Los Angeles (\$96,750). Navy previously spent \$570,000 for development of advanced models expected to decrease jet noise by 45 to 55 decibels, whereas 132 units now ordered involve 20 to 35 db reduction.

Turboprop engine overhaul periods are fast overtaking their piston predecessors. Capital has 1,800 hrs. approved for Rolls-Royce Darts, is now running test engines up to 2,000 hrs. These periods are for entire engine with no intermediate "hot section" replacements scheduled. British European Airways trails Capital with a 1,500-hr. overhaul for Dart 510s, hopes to reach 2,000 hrs. by the year-end. Best overhaul times for piston engines are but a shade over 2,000 hrs. for a few models after some 23 years of modern piston engine experience.

Engine manufacturer turned aircraft salesman is the role being assumed by Allison Division of General Motors to market its Model 501 engine on converted Convair 340/440s. Following recent successful CAA certification project it handled on Napier Eland-powered 340, Pac Aero Engineering Corp., Santa Monica, will start modification and certification of an Allison 501-powered version.

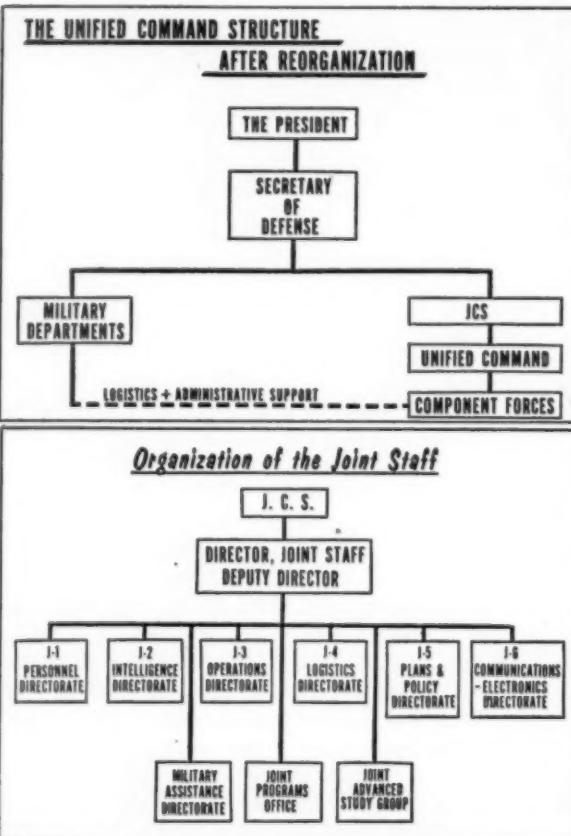
CAA already has opened a project on the Allison Convairliner and Allison is quoting November 1959 delivery for the first aircraft. After that date, it offers delivery 60 days after an order is signed and will handle all financial and contractual arrangements. Pac Aero will perform the modifications under agreement with Allison.

Douglas is closing the gap and could overtake Boeing to get on the roster of "firsts" with jets in one category. Its big opportunity: First to fly a Pratt & Whitney J75-powered jet transport. DC-8 flight with J75s was imminent at presstime, whereas first Boeing 707-320 was still on the final assembly line at Renton.

AIR NEWS IN BRIEF

Major changes in the structure of the Defense Department started Sept. 1, with the reorganization of the Joint Chiefs of Staff. JCS under the new plan takes on operational responsibilities, as the eight unified and specified commands move out of the control of the Army, Navy and Air Force into the control of the Secretary of Defense.

First command to move into the direct control of the Secretary of Defense is U.S. Europeon Command under Gen. Lauris Norstad (USAF). Move will be made Sept. 15. Next commands to make the shift are the Eastern Atlantic and Mediterranean Command, and the Alaskan Command. Move is scheduled for Dec. 1. Remaining six commands including Strategic Air Command will come under Secretary of Defense control about Jan. 1. New structure follows:



New firm has been formed to handle sales and service for Doman Dalto simulator. Dalto Corp., a Delaware corporation, has been set up by a group headed by former Doman special products sales manager

Ward D. Davis. Davis has been named president and Guy Brown, a former American Airlines pilot, is airline commercial sales manager. New company headquarters at 2 E. 45 St., New York. It will have no corporate connection with Doman, although latter retains all manufacturing rights to the training device for simulating low-weather approaches.

U.S. thinking on passenger oxygen in jets has become regulation. CAB has adopted, effective August 27, amendments to CAR 4b, 40, 41 and 42 pinpointing the jet needs. Big change comes in operations above 25,000 ft. Instead of distributing oxygen masks to needy passengers under piston aircraft practices, rules require that dispensing units be connected to oxygen supply terminals and immediately available to each passenger. Above 30,000 ft., dispensing units shall be automatically presented to occupants in event of sudden decompression. Operators must carry at least 10% more masks than seats.

Also above 25,000 ft. one pilot will be required to wear and use oxygen at all times; other crew members must have masks on their person at all times in position for immediate use. Before operating above 25,000 ft., carriers must brief passengers on the use of oxygen equipment both by instruction and demonstration.

Names in the news at presstime: **Frederick C. Hines**, v.p.-finance at Douglas Aircraft Co. resigned due to illness, hopes to return January 1 for a new assignment. **Col. Harry G. Spillinger**, retired head of production engineering in Air Materiel Command, is named to head new systems reliability and safety control office in Boeing Airplane Co.'s systems management office. **Clyde Skeen** advances from controller and asst. general manager-operations to asst. gen. mgr. of Boeing systems management office. **Walter H. Johnson Jr.** moves from v.p.-passenger sales at American Airlines to senior v.p.-marketing for Capital Airlines.

Dates for the record. **August 22:** Lockheed received CAA type certificate for its Electra turboprop. **August 23:** President Eisenhower signed bill S.3880 creating the Federal Aviation Agency independent of the Department of Commerce.

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Alouette Sets Six New World Records

Farmingdale, L. I.—Among six records for rotary-wing aircraft established by the Alouette, a jet-powered helicopter, is a new world altitude figure of 36,501.125 feet. This is 6,201.125 feet higher than the one set in December 1957. Official confirmation is expected shortly from the Federation Aeronautique Internationale. The information was released here by Republic Aviation Corporation, who assembles and markets this five-place, French-designed craft in the United States and Canada.

All six records were set at the French Air Force Test Center, Bretigny, on June 13, a Republic spokesman stated. Included was a record for climbing to 31,267 feet with two passengers, topping the mark for helicopters in the 2,205-lb. to 3,858-lb. payload class.



BUSINESS BOX

ELIZABETH

sic Supreme Court case. At the end of the book the author accepts that "it is a special type of the American And I am as In the no details abo

The Alouette* is not only setting new world records abroad, but in the U. S. it is establishing outstanding operational figures daily. One example is its performance for Aetna Helicopters, Inc., flying out of New Mexico for the U. S. Forestry Service. Within 30 days, one Alouette has . . . carried 54,623 lbs. of cargo, 214 passengers—made 246 flights—flown 97.51 hours with an amazing corrective maintenance figure of only 3 hours. Working at altitudes ranging from 7,000 to 10,000 feet every time, as many as 32 missions have been accomplished in one day of operation.

Equally impressive are the Alouette's commercial performances at sea level. Operating out of Louisiana in the Gulf of Mexico, the Alouette II is now serving oil rigs located 72 miles off shore at high temperatures and under maximum gross load requirements.

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AIR TRENDS

Manufacturers are going to have to spend more and more of their own money if they expect to stay in the aircraft and related fields. Mundy I. Peale, president of Republic Aviation, sounded this warning to industry in a recent speech: "the time is long past when we in industry can build up our manpower and facilities after a contract is received. They are needed now, in advance, to submit ideas that are basically sound, technically accurate and novel in concept." Republic recently committed \$35 million of its own funds to speed an extensive R&D program to develop advanced aircraft, missiles and spacecraft.

Air Force may be in the fight of its life over its place in the air defense picture. Theory of the service is that enemy bombers and missiles ought to be knocked down as far away from home bases as possible. Economy dictates that there won't be as many fighters or missiles as USAF would like. Question is: Should concentration be on fighters or on Bomarc's? If a decision isn't made soon, Army might move in with its own point-defense Nike missiles, which it is now selling hard.

There could be more interest in fiscal 1960 in somewhat less high-performance aircraft, if the Joint Chiefs buy the thesis that you can kill a man just as dead with a 22 calibre rifle as you can with a megaton bomb. Lessons of the Lebanon and Jordan crisis are being studied, with the belief growing in all of the services that strategic forces are needed as the deterrent for big wars and to prevent a little one from getting out of hand but also that weapons must be available to handle the lesser jobs.

Navy is expected to renew its interest in developing high-speed seaplanes as the result of a major breakthrough in hydrofoil concept. BuAer is studying a new "super-cavitating" theory developed by Office of Naval Research which ONR officials say should make possible hydrofoils capable of 200-knot landings and takeoffs. One of the troubles with the Convair XF2Y-1 Sea Dart was state-of-the-art hydrofoils which

became highly inefficient and unstable at high speeds. ONR went so far as to say the new concept not only eliminates speed limitation but also makes possible seaplanes "of any size."

Unnecessary and burdensome reporting may be eliminated at Air Materiel Command. Gen. E. W. Rawlings, AMC chief, has expressed shock at an analysis of reports required from five major contractors. Study shows a total of 222 required from one or more contractors. Manpower costs are estimated at more than 1,270,000 man-hours per year—and this doesn't include cost of materials and machine hours.

Air Materiel Command will become almost entirely a management operation, with increasing decentralization to the Air Materiel Areas, if Gen. Rawlings has his way. Only orders for the biggest contracts will be written in Dayton, under these plans. (See page 21.)

Defense Department hopes to keep "buy" programs on relatively even keel in fiscal 1959. It expects Army, Navy and Air Force to watch their costs and make necessary changes, thus avoiding major reprogramming and expenditure rates that get out of hand.

Air Force Woods Hole, Mass. Conference could provide clues as to USAF concepts of warfare 10 years or more in the future. Its ending could also end the speculation as to the future of Lt. Gen. Donald L. Putt (USAF, ret.), who has been acting as executive secretary of the conference. Whether the conferees will come up with any recommendations with respect to changes in the organization and structure of Deputy Chief of Staff (Development) or Air Research and Development Command remains to be seen.

First look at X-15, research aircraft will come in mid-October, when the plane's manufacturer, North American Aviation, is expected to roll it out in the presence of high officials of the National Advisory Committee for Aeronautics, the Air Force and the Navy.

Biggest question mark in Defense Department reorganization is in the handling of research, engineering. Answers won't be available until after Defense Secretary Neil H. McElroy taps a nominee for the job. Meantime, Advanced Research Projects Agency and Guided Missile Office continue to act as quasi-independent agencies, which could make it harder for the new director to supervise and direct all DOD research, as the Reorganization Act provides. It could be six months before the situation is clarified.

New price redetermination clauses may be issued for inclusion in Defense contracts before end of year by DOD's Armed Services Procurement Regulation Committee. Industry is "disturbed" over what appears to be more than usual emphasis on the development of elaborate cost information by contractors. Industry points out that price redetermination is used mainly in fixed-price contracts, in which an overall reasonable price is more important than a detailed breakdown of the component elements.

Air Force reports are due about Sept. 20 covering flight plan information from the Air National Guard and Air Force Reserve on all tactical, support, combat readiness training (CRT) and other local flights conducted within the continental U.S. during 24-hour periods of Aug. 21, 23, and 24. Objective is to help provide air traffic data as a basis for long-range estimates of required aviation facilities. Airways Modernization Board is making the study.

Boeing still isn't willing to go all-out in helping solve the financial problems of airlines interested in the 707 or 720. While it has taken a few trades, it reportedly has not become involved in any of the engine lease arrangements now being worked out by other companies.

Subsidy for development and operation of aircraft meeting military specifications will be proposed in the next session of the Congress as a substitute for the expansion of direct military capability now wanted by the Army. Proposal will be patterned after ship subsidy legislation. Biggest stumbling block could be costs. Odds are

better than even money that at least a "token" authorization will be forthcoming to establish the principle that airlift is now an instrument of national policy. Some what similar proposal was offered in 1950 by the then Maj. Gen. C. R. Smith, now president of American Airlines. However, the combination of Korea and the cost of operating such planes as passenger carriers, as then suggested, killed the plan. It will have at least some Administration support.

Administration will continue to stand fast against sizable deficit financing for defense, holding to the thesis that a sound economy is the essential key to the long-term cold war. Administration policy was reiterated by Defense Secretary Neil H. McElroy in a speech before the American Legion in which he insisted that the U.S. remains substantially ahead of Soviet Russia except in the field of long-range ballistic missiles. The Administration fiat that income shall be generally the guide to spending is taken despite the recommendations of the Committee for Economic Development, the Gaither Committee and the Rockefeller Committee.

New proposals are expected to clip MATS wings. Congress is not expected to stop with the current requirement that MATS farm out a minimum of 80% to the private carriers. Next session might see an effort to cut the authorized number of flying hours for MATS. Opponents of the plan will argue that a real cutback in MATS flying hours would serve only to reduce the airlift capability already claimed by the Army to be inadequate.

Air Force will attempt to bring order out of the chaos of air defense. In charge of the almost insoluble headache is a tri-command unit headed by Maj. Gen. Kenneth P. Bergquist, of Air Research and Development Command. Mitre Corp., a new non-profit scientific organization named for Massachusetts Institute of Technology, Research, Engineering, will act as technical consultant.

First production General Electric CJ-805 commercial jet engine will be delivered this month. Until now, GE deliveries have involved only engines for test purposes.



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"WASHINGTON, July 1, 1958—All work on Defense contracts ground to a halt at midnight, June 30, as Defense Department authority to pay bills ended and the right of manufacturers to produce under continuing contracts ceased. Congress will not be able to complete work on Defense Department appropriations until about August 15."

Military Aviation's Brush With Death

By Betty Oswald

Defense Editor

The paragraph above could have been the lead story in every newspaper in the U.S. if H.R. 8002 had passed in the form originally proposed by the Second Hoover Commission for the Reorganization of the Executive Branch of the Government. The bill is labeled an act "to provide for improved methods of stating budget estimates and estimates for deficiency and supplemental appropriations."

That a watered-down law was enacted was a kind of legislative miracle. Normally, laws dealing with the exact and precise provisions of budgeting excite little or no attention from either the Congress or from industry.

But fortunately, the "once bitten, twice shy" adage was applicable when the aircraft industry and others saw the original proposal. It provided that budgets be submitted on the basis of "annual accrued expenditures." This meant that budgets would be submitted on the basis of the value of goods and services to be received in a fiscal year, progress payments, and such other payments as are authorized by law to be made in such fiscal year . . ."

In other words, in terms of the aircraft industry (where lead-time is from 10 to 18 months) no funds would be available for financing except as specifically included in the annual accrued expenditures. It meant also that no defense program would be any better than the "guesstimates" made by the Defense Department about a year in advance of the budget year.

*** Complication piled upon complication**—to make a bad matter worse, the bill as originally drafted, would have canceled any appropriation not actually spent during the fiscal year. This meant, in programs which frequently run for a period of three years, no money would be available from the end of one fiscal year until Congress

made new appropriations—and a whole series of administrative steps were taken to again start the flow of money.

Perhaps what all of this means can be better explained in terms of a specific example. Assuming the enactment of the Hoover proposal, a military service makes a contract with a manufacturer of aircraft engines. The amount of the contract is \$10 million. Contract provisions call for accrued expenditures of \$2 million—a figure covered by the cash appropriation for the fiscal year. Any part of the sum not actually spent would lapse at the end of the fiscal year.

The remaining \$8 million would be covered by contract authority. In the second year, estimated accrued expenditures under the contract would amount to \$5 million under the contract and new contractual authority of \$3 million would have to be provided for engines to be delivered in the following year. Again any money not actually spent would lapse. In the final year, cash appropriations would be provided to pay for the engines scheduled for delivery that year. No new contract authority would be needed.

On the surface, this all sounded fine. It was easy to visualize the closing of one set of books on June 30, the opening of another set on July 1. But what would have happened to the continuing contracts? They would have had to wait for new Congressional action. And what would have happened if estimates of expenditures were either understated or overstated?

Variations of estimates are common. And the reasons, in the case of individual contracts, are many. They stem from such variables as unexpected increases in the cost of labor and materials; slippage in delivery schedules; changes in requirements; technological difficulties or breakthroughs; changes in money rates; work stoppages either in contractor or subcontractor plants; and, in some cases changes in procurement practices.

In cases of underestimates of expenditures for budget purposes—something which could happen—it was obvious that the whole economy would be affected. There wasn't any question in anyone's mind of what happened last year when, temporarily, the Air Force and other services ran out of funds, with the attendant cutback in schedules, layoffs of personnel and other economic effects still being felt.

In its final form, the law bears little resemblance to the original proposal. But the fight was a close one with the decision not in until after the House Appropriations Committee and later the Senate Appropriations Committee got to work on the measure.

*** What does the new law provide?**—First and perhaps most important the law, as passed, makes no change in the method of appropriations. This means that "no year" funds are continued for procurement and production items. It means that if a contract isn't placed in one fiscal year, it may be placed later. This is considered a way of avoiding waste because it avoids the tendency to rush into a production contract before the item to be purchased has been fully proved.

It means also that almost all programs will be fully funded. Pentagon fiscal experts say that the services are required to have all of the money available to finance all of the bits and pieces as well as the 6, 60, or 600 aircraft they plan to buy. This would apply whether the aircraft production will await the production of engines or fire control equipment for perhaps as long as 18 months.

Then what does the new law really do? It is entirely permissive in character. For it to become operative, the President would first have to determine that a satisfactory accrual accounting system has been developed for a given appropriation. Having made such a finding, he then would include in his budget request proposed limitations on

annual accrued expenditures. However, the Congress retains the right to accept or reject these limitations.

In addition, on the theory that one expenditure estimate might be overstated and another understated, the law would allow proposals permitting transfers between expenditure limitations. This means that if the estimated expenditure for engine "X" were understated, funds could be transferred from airplane Y where expenditure estimates were overstated.

Congress also took care of the situation where liabilities under a contract might be incurred in one year, payments could be made in later fiscal years, as required. This is a saving clause which would prevent the lapse of unused appropriations at the end of the fiscal year.

Finally, the law will expire—unless renewed on April 1, 1962.

• What does this all mean to industry?—Thoughtful people in the Defense Department say it means little or nothing since, to make it effective at all, a "satisfactory accrual accounting system" must be found. So far no one has found the perfect accounting answer to the complicated business of buying ships, aircraft, tanks and literally millions of other items.

There is little or no chance that President Eisenhower can make the necessary finding for the 1960 fiscal year budget now in preparation. What comes afterward will depend on many things, including the mood of the administration and the Congress, the accuracy or inaccuracy plus or minus perhaps \$1 billion of service expenditure "guesstimates."

Fiscal experts say that better expenditure estimates are a "must" for debt management. Industry will be asked to cooperate, to avoid the spectre of another try at a tight accrued expenditure law.

Hope is that trouble can be avoided, with obligations furnishing a basic control on the expenditure rate. What the Defense Department is asking for is an orderly placement of contracts. It wants the services to crank in the price increases as they occur, cutting back contracts if need be to stay well within financial resources.

Each of the services have been given an expenditure target. Defense officials say that the targets aren't inflexible but rather indicate the money which the Army, Navy and Air Force can pay out without embarrassing the Treasury. If expenditures get too high, they are expected to take a new look at their programs or to notify the Secretary of Defense that they are overboard for one program or another.

Decision Looms in Aircraft Battle

The running battle between the Army and Air Force over airlift capability may move somewhat closer to solution when a study now under way by the Joint Chiefs of Staff is completed sometime in September and is transmitted with JCS recommendations to Defense Secretary Neil H. McElroy.

Actually the study was ordered about a year ago. It represents an effort to determine whether air and sealift will be sufficient to handle all of the various types of war in which the United States may be involved. Assuming that a finding is made that the 5,000-odd transport-type aircraft inventory is sufficient to take care of the airlift requirement, the next question would be whether the inventory ought to be modernized and at what rate.

Here, the trouble is basically one of economics. The tendency of the Army particularly, according to informed sources, is "to want all of this and heaven too." In other words, while modern airlift is wanted, higher priority is still being given to such weapons as the antimissile missile, streamlining of divisions and the like.

Air Force is also guilty of the same offense in the sense that while it would like to modernize the airlift, it still believes that other weapons needed to deter all-out war must have first call on its resources. And the Air Force position is further complicated by the fact that, no matter what the Military Air Transport Service does, it is criticized.

If new and more efficient aircraft were provided to satisfy the Army, the fear exists that MATS would be pressured to use the aircraft in order to maintain efficiency and at the same time be charged with unfair competition against the commercial airlines.

• What kind of war?—What's at issue fundamentally, however, is the kind of war which the United States may be called on to fight. In recent months, it has been the growing position of the Army, Navy and Marine Corps that the most likely wars are so-called "limited" or "brush-fire wars."

As far as the Air Force is concerned, it has until recently espoused the theory that the strategic forces can be the principal deterrent for not only a big war but also a little war. Now, the pendulum is reportedly swinging a little. The AF position now is that Strategic Air Forces are essential to the winning of a big war and might prevent a little war from becoming a big war. However, concededly, SAC would not necessarily win a little war.

The result is that transport both by air and sea have become more important. Recommendations by the JCS could mean more money for airlift in the 1960 budget. However, there are still many major technical and economic problems to be settled. These include:

(1) A definition of a "little" war.
(2) Where would such a war be fought and what would be required in the way of forces and equipment to win it? This particular question becomes of grave importance in determining the type of modern airlift and its numbers because of the problems of fuel and maintenance and even the ability to land in some areas.

(3) Can specific quantities of airlift be assigned to the Army in advance? This also provides a major headache because, as one informed source put it, "we aren't in the fortunetelling business" and can't be sure what our enemies or even our friends have in mind.

One of the possible solutions would be to build at least one big seaplane transport and try it out. The Army is interested in this concept on the theory that lakes and harbors are plentiful in most areas of the world where limited wars might be started. However, Air Force points to existing major technical problems. The Marine Corps, in testimony on Capitol Hill, aligned itself with the Air Force on this point.

If the decision is made that the airlift capability must be modernized, the next question will be: What kind and how much.

Seats for 707

TECO units meet TWA's energy-absorption specs

TECO, Inc. in Burbank has been awarded TWA's order for 33 passenger seats for its Boeing 707s by meeting the carrier's design requirements for energy-absorption structures.

Gordon K. Jones, TECO president, said that to his knowledge TWA is one of the first airlines to spell out actual energy-absorption requirements for jet-liner seating.

The TWA specs call for seats to absorb pulses ranging from 20Gs of 0.1 second duration to 30Gs for approximately 0.05 second duration. Seat extrusion must not exceed 6 in.

TECO worked out a test rig at its Burbank plant to demonstrate that its seat design fulfilled these requirements. Sandbag-loaded seats were dropped from varying heights against a beam.



SEATS ABSORB IMPACT successfully after being loaded with sand bags and dropped from cantilevered tower.

Hydraulic plungers supplied readings on the G forces applied.

At approximately 32Gs, one leg on a conventional (4130 chrome moly steel) double seat snapped off while the same seat with a TECO energy absorber incorporated in the structure remained intact.

Conversion Proposal

Allison suggests 501-D13s for Convair 340s and 440s

Allison Division of General Motors is offering a package deal to the local service airlines that will it hopes, offer competition to the Fairchild F-27 Friendship. The idea is to convert Convair 340s and 440s—using the Allison 501-D13 turboprop engine which will power the Lockheed Electra.

Engines can be leased on quantity conversions when requested by the airlines, in very much the same fashion as the Electra powerplants are being leased. Cost of the conversion for those owning the airframes would be between \$400,000 and \$500,000 per aircraft—depending on interiors and whether the airframe is a 340 or 440. It would be reduced somewhat by the resale of existing powerplants.

Work on the conversion would be done under a contract by Allison with Pacific Airmotive. Actual work will be done by Pac Aero Engineering Corp., Santa Monica, Calif.

The Model 501-D13 is rated at 3,750 eshp for takeoff under static, sea-level, standard-day conditions. This is made up of 3,460 shaft horsepower and 290 equivalent horsepower from jet thrust. Shift-over from the reciprocating engines to the turboprops would, according to Allison engineers, boost the rate of climb to 15,000 feet from about 700 fpm to 2,000 fpm.

Speed at 47,000 lbs. would be increased from 270 mph to 350 mph with the turboprops. With the conversion, the aircraft could carry either 44 or 55 passengers depending on seating arrangements.

Because the aircraft was originally designed to take turboprop power, the structure can take-off with a gross weight of 53,200 lbs. and land with a gross weight of 50,670 lbs.

Allison figures that cost per mile using the turboprops will be about \$1.25 as compared with \$1.60 using small jet engines—or a cost per hour of \$385 compared with \$610 per hour for the small jet.

So far there are no takers for the Allison proposal to convert the Convairs. However, the company reports some of the airlines are "interested." Present aim is a program calling for conversion of 10 aircraft with major emphasis placed on the corporations that are in a position to make quick decisions.

AMC Reshuffled

Weapon system offices will be more important

Major reshuffle of Air Materiel Command's Directorate of Procurement and Production will become effective Sept. 15. Objective is to increase the stature of Weapon System Project Offices and to separate the staff and operating functions of the Directorate in the hope that by doing so decentralization of procurement activity can be made effective.

Under the change order, Directorate of Procurement and Production becomes a staff function. Headed by Maj. Gen. W. O. Senter, it will consist of a deputy for production who will be responsible for three divisions—production management, production planning and production engineering.

Central buying on large contracts and weapon system operations will be handled by the Aeronautical Systems Office. Brig. Gen. Beverly H. Warren will head the new office which will report directly to Gen. E. W. Rawlings, AMC Chief.

The new Aeronautical Systems Office will be responsible for five separate divisions:

Under strategic systems will be the B-52, B-58, B-70, strategic missiles, guided air missiles, advanced nuclear bomber and tanker weapon system project offices.

Under air defense will be the F-101, F-106, F-108, guided air rockets, Bomarc, drone and electronic support system project offices.

Under tactical and support systems will be the F-104, F-105 tactical missiles, transport, trainer-helicopter and liaison weapon system project offices.

Equipment will be responsible for six divisions: propulsion, guidance, communications, reconnaissance, accessories, airlines maintenance and services, and government-furnished aircraft equipment control.

Resources will be composed of industrial facilities, manufacturing methods and material control divisions, including Aircraft Production Resources Agency.



Grumman Aircraft Engrg. Corp. photo.

Gulfstream Sparks Grumman's Commercial Comeback

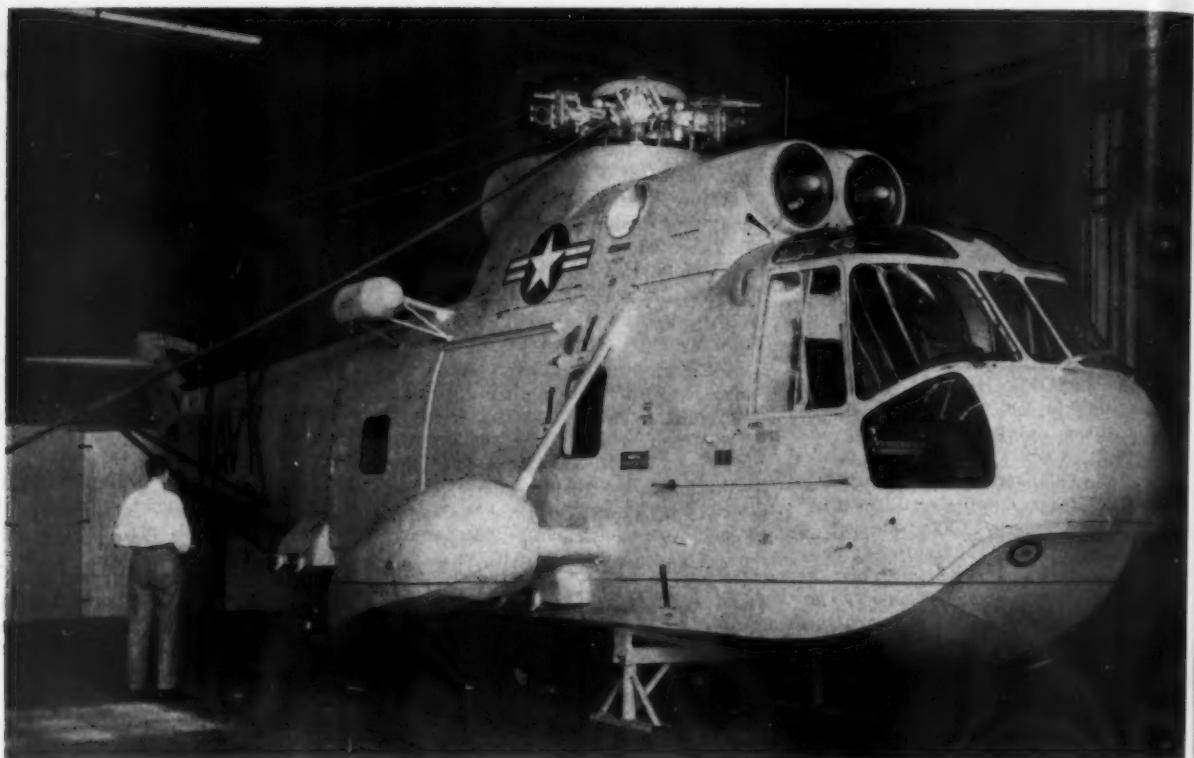
Orders for 27 Gulfstreams, twin-engine, executive turboprop, have been received by the Grumman Aircraft Engineering Corp., following the first flight of the aircraft Aug. 14.

Grumman has named four distributors for the 10-19 place, pressurized transport, which has a range of 2,200 miles plus reserve and a maximum

cruising speed of 370 mph at 25,000 ft. The distributors: Atlantic Aviation, Wilmington, Del.; Pacific Airmotive, Southwest Airmotive and Timmins Aviation of Montreal.

Aircraft will be delivered to the distributors without interior furnishings or equipment. The distributors will supply custom equipment.

—AIR NEWS IN PICTURES—



For Pilots Faced With Fog

Pilot display projector creates simulated images of the horizon and earth on a screen in front of pilot flying through fog. Developed by North American Aviation's Autonetics Div., the device was designed for the Army-Navy Helicopter Program to eliminate vertigo. The system can be modified for fixed-wing planes.



Power
Sikorsky
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'Copter Flying Boat

Powered by two GE T58-6 gas turbines, Sikorsky's new S-61 helicopter will be ready for flight in 1959. The anti-submarine craft—designated the HSS-2 by the Navy, has engines mounted side by side above the fuselage to minimize ingestion of water and dust. Engine maintenance is facilitated by hinged access platforms formed by opening the engine cowling.



Combination Craft

Kaman's K-16B, a VTOL/STOL research aircraft is being developed for the Navy. Small controllable flaps on the propeller/rotors gives the pilot control of the aircraft at speeds of 0 to 50 mph when conventional controls are not effective. Above 50 mph the flap control phases out automatically and conventional controls take over. Air speed of 300 mph by two GE T58 gas turbines.



Turbine Tug for the Jet Age

Boeing power moves Boeing power as this low-slung Turbo-Tug groundhandles a production 707. Produced by Napco Industries, the 49-in. high tug is powered by a lightweight Boeing 502-10C gas turbine engine which supplies 240 bhp. The planes are moved by contact between tires and the tug's friction rollers.

Fairey Licenses Rotodyne to Kaman

The World's first VTOL turboprop airliner will be made available to U.S. commercial and military users through a license agreement reached between The Kaman Aircraft Corp. and England's Fairey Aviation Co., Ltd. The agreement also calls for the manufacture of the aircraft in the U.S. by Kaman. The Rotodyne carries 48 passengers or 12,000 lbs. of cargo at a cruise speed of 185 mph.



Boeing Airplane Co. photos.

'Down Lift' Jacks Up Plant's Headroom

By Ted Snider

Chief Engineer, Materialift Div.
The Joyce-Cridland Co., Dayton, Ohio

How do you install a 48.3-ft. vertical fin on an airplane when the roof of the assembly plant is only 45.8-ft. high?

Boeing Airplane Co. faced this problem in producing B-52 bombers at its Wichita facility. The B-52 fin will fold, but it has to be rigged and faired during final assembly at full height.

Raising the roof would have been too expensive. An alternate solution was conceived under the leadership of John M. Midgley, superintendent of Boeing's final assembly section. It was decided to lower a portion of the concrete floor, and at that point in the planning we were called in to make recommendations and supply the necessary equipment.

Lowering the floor is not as difficult as it might seem. The 200-ton B-52, like other large aircraft, must go through final assembly with the landing gears down. By dropping the aft landing gear into the floor to a depth of

3 ft. on a hydraulic elevator, the desired effect would be achieved with only a relatively small area of the floor involved.

So a 12 x 14 ft. pit, 11-ft. deep, was dug and the hydraulic elevator was installed. The assembly crew was then able to rig and fair the fin at full height with 6 in. of roof clearance.

Jig positioning next—This was only the beginning, for Midgley and Tully Straight, co-inventors, immediately saw wider and even more valuable applications for the elevator idea. The 274 costly man-hours that went into placing the plane in jig position became the next target to be sunk.

The jig positioning procedure then being used by Boeing at Wichita involved clearing the airplane, roughly locating some two dozen jacks, connecting the manifold system and bringing all jacks in contact with the plane's jack pads, setting up optical measuring equipment, manning the jacks and transits during lifting operations, and establishing jig position for the airplane by measurement. About 90% of the

time was tied up in these latter two operations, and all steps had to be taken three separate times in each final assembly.

The first step in cutting this time was the construction of a second pit and installation of an elevator for the B-52's forward landing gear. Using the new procedure, the forward and aft landing gears were both lowered into the elevator pits, and the plane's weight settled over a number of fixed-height stands on the plant floor.

The stands are located in floor receptacles to allow a clear floor area when not in use. The jack pad contacts on the tops of the stands are adjustable in all horizontal directions, to provide for accurate contact with the airplane jack pads. Nineteen of the jacks originally used to raise the plane were discarded, as were a number of mechanical components required in the old system.

Time established to complete this operation is presently 30 minutes for 10 men. But Boeing's well-trained crew can do the job in 10 minutes when the B-52 is spotted in the ideal

position initially. This represents a time-saving of 269 man-hours or 98% per jacking operation. This saving does not include the idle time of the assembly crew which was unproductive during the jig positioning operation using the old method. In line with its unique performance, the lifting device was named "Down Lift" by the Boeing crews.

Following is the procedure for the two "Down Lift" operations now used at Boeing's Wichita plant:

- **The "too-tall" fin**—The "Down Lift" operation which enables workers to erect the tall vertical fin indoors is relatively simple. The airplane is towed by a tractor onto the elevators. Painted areas guide the tires for accurate lateral positioning. The airplane must be located fore and aft within plus or minus 2 in. of a specified point.

Support stands are then raised at the wing jack points near the inboard engine mounts, and at designated points along the fuselage. The aft landing gear elevator is lowered until all stands are $\frac{1}{2}$ in. from the airplane jack pads. All points are checked for contact and the landing wheels are clear.

- **Jig positioning**—The jig position operation involving "Down Lift" is slightly more detailed. The airplane is positioned by the tractor according to the requirements outlined above. Special wing lift jack assemblies are positioned under the wings at jack points near outboard engine mounts. The droop is then taken out of the B-52's wings by raising them approximately 29 in. A stop is provided on the wing lift jack assemblies at this point.

The droop is removed in order to relieve strain on the wings caused by their weight and that of the engine pods. Leveling the wings before taking the load off the landing gears also eliminates excessive lowering of the plane and unnecessary lateral motion of the jack points during the operation.

After the droop is removed, the lifting stands are positioned. Landing gear elevators are lowered until jack pads along fuselage are approximately $\frac{1}{2}$ inch from stands. At this point, the tail jack and inboard wing jacks should be in contact. Wing lift jacks are lowered and removed from the area. Landing gear elevators are lowered simultaneously until all jack pads are in contact with the stands and the landing gear wheels are clear.

Operations now possible with the B-52 in "down" position include testing of retraction and lowering devices on the landing gears, installation of

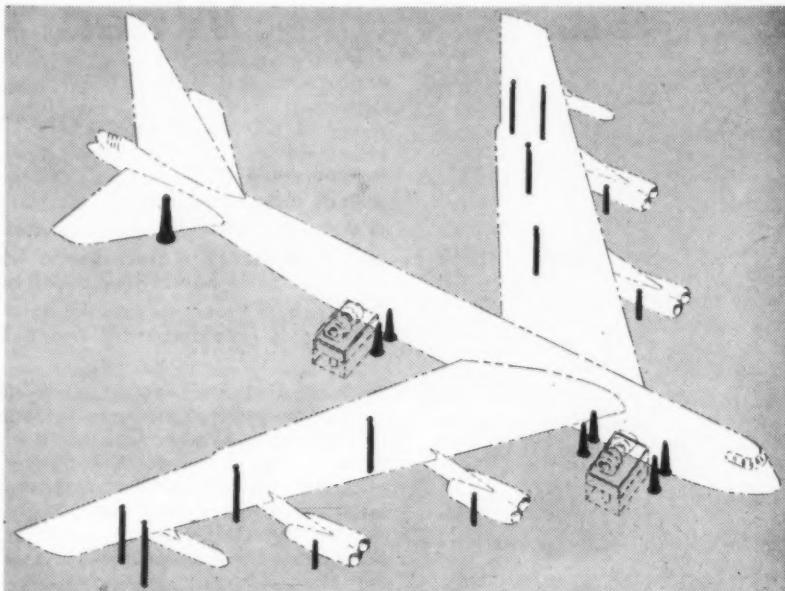
wing close-out panels, and equipment checks on various control surfaces without changing position of the fuselage.

Four complete "Down Lift" installations are in use at the Wichita plant and others are contemplated—one, in particular, on the flight line where wings and fuel tanks of operational aircraft can be checked and fuel dumped if necessary.

- **The hydraulic elevators**—Our part in this project was the design and integration of all hydraulic equipment. Lift range of the elevators is from 36 in. below floor level to 2 in. above,

with ample space below the platform for actuation equipment and for landing gear action while it hangs free. An access tunnel connects the two pits for maintenance purposes.

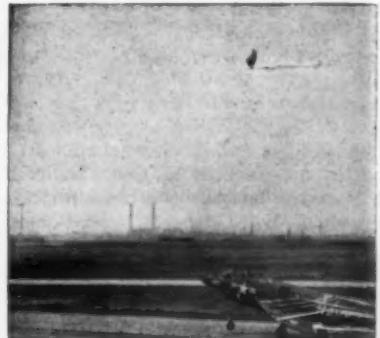
The elevators are full-hydraulic, electrically operated. Each platform is supported by twin pistons which are synchronized with a rack and pinion equalizer. A Sylsen, designed by General Electric, controls the two platforms, which can be operated together or separately. The Sylsen is particularly helpful on the tandem operation, keeping the platforms within $1/16$ in. of each other.



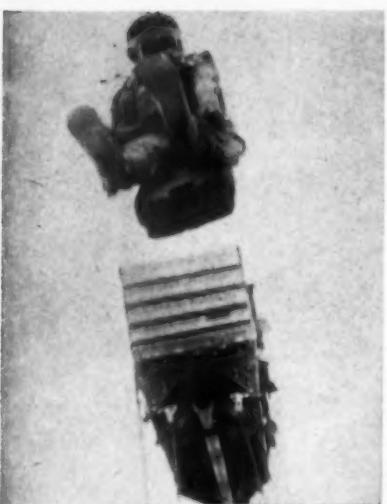
NINETEEN WING LIFT jack assemblies were used in jig positioning operation.



HYDRAULIC elevators are used under landing gears in "down lift" operation.



Official U.S. Navy photos.



A siren wails . . .

A deck catapult is fired . . .

A McDonnell F3H interceptor hurtles forward . . .

Suddenly, there's a crack like a whip and a figure soars up out of the cockpit hotly pursued by a ball of fire and a puff of smoke . . .

A parachute blossoms and the figure floats safely to earth. The F3H comes to a stop enfolded in the strands of a crash barrier.

What made this unusual series of events even more unusual was the fact that the figure ejected from the cockpit had cleared the seat immediately after the seat had separated from the aircraft—something highly satisfying to the personnel of the Navy's Air Crew Equipment Laboratory at the Naval Air Materiel Center, Philadelphia.

For this was another test in a series being run by ACEL to develop a ground level ejection system for installation in fighter and attack aircraft with a minimum of delay and expense. The figure was an anthropomorphic dummy, which explains why everyone ran to examine the barrier (also under test) and the ejected seat—virtually ignoring the "pilot" spreadeagled on the ground.

The ACEL group directly responsible for this particular series of tests is the Escape and Crash Safety R & D Division headed up by Chris T. Koochemberg. This group becomes involved in a variety of equipment studies, but the bulk of its effort is concentrated on getting the crew out of a stricken aircraft safely. At present, top priority is being given to the problems surrounding ground level ejection.

According to ACEL, Navy would like to be able to modify standard seats to get the required performance and, to this end, the lab has been experimenting with the standard NAMC

Type II seat catapult. Designed and developed at ACEL back in 1947, this catapult has a 40-in. power stroke and gives a launching end velocity of 60 ft./sec. On ejection, it propels the pilot to a height of about 45 ft. above the aircraft at takeoff speeds.

This capability is adequate for ensuring that the ejected pilot will clear the aircraft's fin at high speeds. However, it is not enough to bring him safely through ejection from ground level or very low altitudes. ACEL's first step was to put more wallop into the Type II catapult.

You can't do this by merely packing a more powerful explosive behind the pilot, because the human spine can take only about 21 Gs in the vertical plane. So ACEL has maintained the 18-20 Gs force which exists in the Type II catapult, but has added a telescoping tube to the standard catapult to give a 56½-in. power stroke. This has increased launching end velocity to 72 ft./sec. and dummies have been boosted to heights of better than 75 ft. during a takeoff run.

But getting the pilot well clear of the aircraft is only part of the problem. Rapid separation from the seat has been a major headache in the development of any low level ejection system for use at aircraft takeoff speeds. Rather than employ a drogue chute to pull the seat away from the pilot after

IN ACEL TEST, modified standard Navy ejection seat is snubbed from dummy. Lap belt release cable (at right of lower photo) has released pilot. Rod at left measures velocity. Tests also showed up requirement to stop flailing of cushion.

ejection Seat...

ejection, ACEL and several aircraft manufacturers have pursued the idea of snubbing—momentarily arresting the seat as it leaves the cockpit.

However, the approach to snubbing being followed by ACEL differs somewhat from that followed by such companies as Douglas and Chance Vought, who have developed systems for use with the A4D and the F8U-1 respectively. They use nylon line, whereas ACEL, working with the more powerful, ground level catapult, is snubbing the seat with fully annealed stainless steel cables.

• **Seats and snubbing**—Because of peculiarities in the installation, the current ACEL tests—using a suitably modified F3H—are centered on the seat being used by Chance Vought in the F8U-1. Here's how this system works:

The snubbing equipment is tied in with the mechanism which actuates the F8U's variable incidence wing. When the wing is in the takeoff or landing position, two cables attached to the bottom of the seat back are secured by a pin to a common fitting in the cockpit floor. A third, shorter cable, secured to the same point in the floor, goes to the pilot's lap belt release mechanism. When the wing is put in the normal flight position, the securing pin is withdrawn.

If the pilot ejects during takeoff or landing, the lap belt release cable, reaching the end of its tether first, frees him for separation from the seat. When the seat has traveled 77 ins., it's snubbed by the steel cables and the pilot goes on his way unescorted. The automatic parachute release mechanism is actuated when he leaves the seat. The cables stretch another 14 ins. at which point the shear value of the bolts attaching them to the back of the seat is reached, and then the seat goes too.

Since the snubbing equipment is disconnected when the aircraft is in the normal flight configuration, the pilot can make a conventional type of escape at higher altitudes and speeds.

• **Underwater tests**—The story goes that, after the first ejection in history—not a planned one—those trying to gain information for future engineering improvements could elicit from the pilot only an awed: "Gad, what a woomp!" Today, ACEL's ejection tests

UNDERWATER EJECTION TESTS are conducted by ACEL with this modified ship's boiler. Although normally dummy just clears the surface of the water in the tank, net is placed to catch it—just in case.



↑ **IN GROUND LEVEL EJECTION** test dummy's chute is well on the way to full deployment even before start of descent to runway 75 ft. below.

are completely instrumented and include investigation of escapes from aircraft which have crashed into the sea and are sinking, says L. W. Meakin, the lab's technical director.

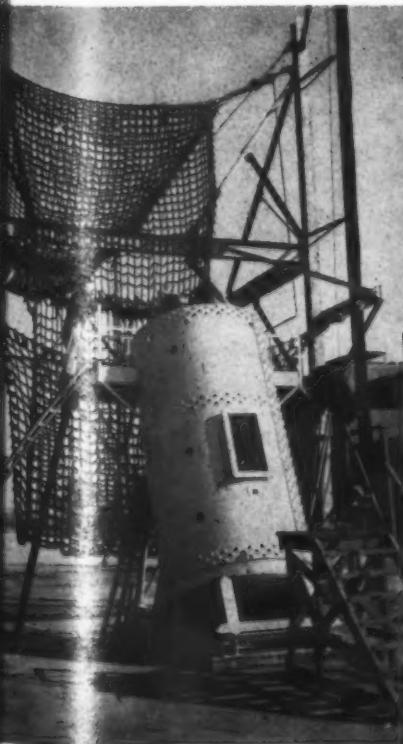
A ship's boiler has been reworked and equipped with ejection seat guide rails for underwater tests. Ejections in this tank have shown, for example, that the Type II catapult will impart a force of only about 9Gs when fired under water. This is due to quenching of the propellant and is considered desirable under such conditions. Further tests have shown that the propellant can be activated to depths as great as 300 ft.

Other underwater tests run by Koochembere's group are made in a swimming pool at NAMC. Here, live subjects are placed in aircraft seats submerged to a depth of about 9 ft. They then release themselves—acting unconscious—to see what happens. These tests have pointed up several problem areas.

For example, it was found that, because the pilot sometimes executed a sort of slow backwards somersault as he floated out of the seat, his parachute had a tendency to catch on the headrest. Also, it became apparent that the line which connects the automatic parachute opening mechanism to the seat would not pull free unless the pilot "started to regain consciousness and moved around a bit."

• **Equipment design affected**—The investigative work done by ACEL under the direction of Navy Capt. R. A. Bosed often is followed by design and development of new equipment at the lab itself. More often, the results of its studies are used by aircraft and equipment manufacturers to improve their products and keep up to date with the latest safety requirements.

(Continued on page 29)





ENGINEERING

For instance, ACEL recently completed a study of one of the major problems confronting the crew of an aircraft prior to bailout—that of how to get his flailing arms and legs under control when his plane is descending out of control. As a result of tests conducted in Navy's big centrifuge at Johnsville, Pa. and in "live" firings on the lab's ejection test tower, ACEL recommended removal of ejection seat footrests provided that adequate support is afforded the lower extremities of the body.

Now, aided by these studies, North American Aviation, Inc. is working on a mechanism for restraining the pilot's arms and legs during bailout. The NAA system will pull the pilot's legs up against the seat and his arms against his chest when he ejects himself. This system will be used in NAA's new A3J attack plane. At the same time, Stanley Aviation Corp., Denver, is working on a system for restraining the pilot's head and torso. ACEL follows these projects closely.

In this matter of safety engineering there's a regular exchange of information between government agencies and private contractors. The collective effort and the application of the best ideas from every source are leading steadily to the day when, though aircraft may be lost, survival of the crew will be a foregone conclusion.

Can anyone build a missile?

Theoretically, yes! Today, even the sandlot Leonardos and knee-pants astronauts are building them.

The problem in this business is to stay ahead of the game, working today on the programs that mark the way into the future. The end result—five to ten years later—must be far more than a missile. It must be a complete operational system, integrally engineered from concept to completion of the mission; produced in facilities totally integrated for designing, building and testing by engineers and scientists who know and understand the problems and requirements of the military. The payoff is in full payload performance in the field—time after time—with military personnel setting it up, proving it out, and operating the controls.

For the creation of today's most advanced missiles and the big space vehicles that are now in the planning stage, Martin capabilities are among the finest in the world. They are the result of a planned program of manpower and facilities development which commenced nearly fifteen years ago with the opening guns of the U.S. Missile Age.

MARTIN
BALTIMORE • DENVER • ORLANDO



ACEL'S NEW 150-FT. TEST TOWER is said to be the highest in the world. Live subjects ride its slanting rails to check out new developments.

Research Boosts 600's Performance

By Fred Hunter

West Coast Editor

The Convair 600, its manufacturer says, was evolved in response to the need for a medium-range airplane combining all the performance and economic advantages of the Convair 880, with an increased seating capacity which may better suit certain route systems.

This is another way of saying that the new model, designed around General Electric's CJ805-21 aft-fan engine, is tailored for routes where both the competition and the loads are high. New York-Chicago. New York-Los Angeles. New York-Miami. Even, perhaps, New York-Washington.

Convair's performance and economic data report on the new model makes interesting reading. The latest revision, for example, shows that the standard fuel capacity has gone up to 101,200 lbs. (15,110 gal.). Here is the way it is pumped aboard: 72,150 lbs. in the wing tanks, 20,750 lbs. in center section fuel cells, 8,300 lbs. in the anti-shock body tanks.

The effect of this fuel capacity is to provide the domestic version of the "600" with a range of 3,700 nautical miles and the overwater version of 3,080 nautical miles, which permits trans-continental or transatlantic oper-



Convair photo.

ANTI-SHOCK BODIES straighten air flow off trailing edge and extend aircraft's maximum cruise speed to as high as Mach 0.91.

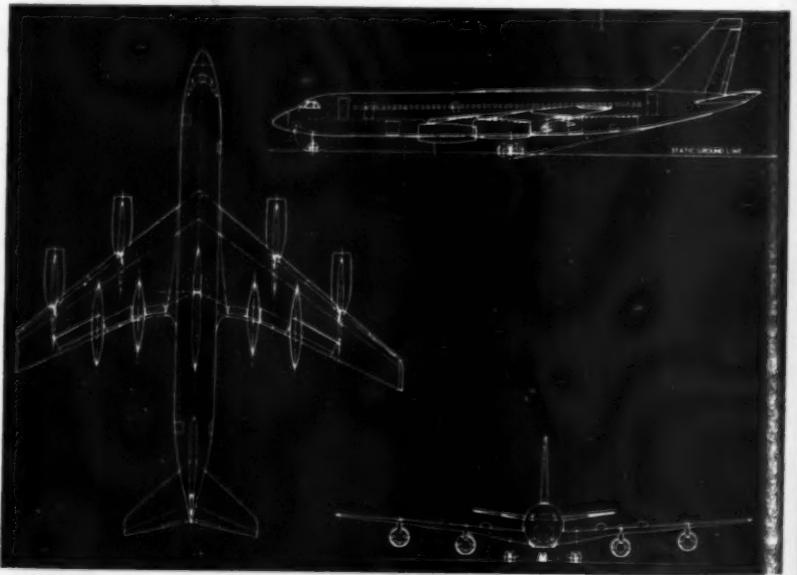
ation with overwater reserves and full space payload.

With the Model 600, Convair is the first manufacturer to extend the speed of a transport beyond Mach 0.90 by making use of aerodynamic anti-shock

bodies. After exchanging windtunnel data with NACA for more than a year, Convair decided initially on the installation of two "bumps," one on each wing. Subsequently, it changed the configuration to two on each wing

600 Specifications

Wing span	120 ft.
Length	139 ft. 5½ in.
Height	37 ft. 6 in. *
Wing area	2,250 sq. ft.
Tread	37 ft. 6 in.
Fuselage width	11 ft. 6 in.
Maximum taxi weight	239,000 lbs.
Maximum gross take-off weight	238,200 lbs.
Maximum landing weight	180,000 lbs.
Zero fuel weight	149,000 lbs.
Weight of aircraft less engines	95,800 lbs.
Dry weight of engines	3,750 lbs.
Payload	
First Class	24,460 lbs.
Coach	29,905 lbs.



and then took advantage of them for the installation of additional fuel tanks.

The two inboard anti-shock bodies are 21½ ft. long and 40 in. in diameter at the thickest point. Together they hold 600 gals. of fuel. The outboards are each 23.9 ft. long and are of 23.65 in. maximum diameter. Together they hold 640 gals.

Leading-edge slots have been incorporated for higher lift and a new reflex trailing edge reduces trim drag. Addition of the trailing edge results in thinning the wing from an average 9% to an average 8%. The GE aft-fan engines call for bigger nacelles and a new fuel system. Electrical system is changed to use four alternators instead of three, but otherwise Convair 600 systems are the same as the 880's.

Compared with 880—While the Convair 600 is actually a version of the Convair 880, it embraces a number of changes and modifications in addition to the anti-shock bodies. The fuselage has the same cross section, 12 ft. 5 in. outside diameter, but is 114 in. longer, making extra seating possible. Wing box is the same, but the wing area has been increased from 2,000 to 2,250 sq. ft. The 449-sq. ft. horizontal stabilizer has 100 sq. ft. more area than that of the 880.

Cabin arrangements for the Convair 600 vary from a four-abreast, 98-passenger (92 plus six in lounge), version to a five-abreast 123-passenger coach and a 137-passenger economy class. The American Airlines order of 25 is for the first-class configuration.

Block performance of the Convair 600 is demonstrated at maximum cruise thrust at 21,500 feet, cruising at speeds up to 550 knots, for optimum block speed operation. The aft-fan aircraft can be operated full throttle in this best speed regime for a range of 2,480 nautical miles. Going to 35,000 feet for optimum yield at maximum thrust reduces cruising speed to approximately 508 knots.

Domestic minimum cost operation is flown at Mach 0.86 (about 496 knots) at 35,000 ft. for ranges up to 1,200 nautical miles and Mach 0.84 (485 knots) at 35,000 feet for ranges greater than 1,200 nautical miles.

Convair puts direct operating cost associated with the minimum cost operation at about \$1.51 per nautical mile for a domestic trip of 1,500 nautical miles. This results in a seat-mile cost of 1.2¢ for the first class configuration and 2.3¢ for the tourist. Convair's cost curves show that for a stage length of 60 nautical miles the direct operating cost is about \$1.70 per air-

craft nautical mile, supporting its claim that the economics of the 600 are such as to provide a profitable operation from the shortest trip distances up to the maximum attainable range.

Airport performance of the aft-fan transport, Convair says, will permit unrestricted operation at virtually all major airports with little or no change to existing facilities. It estimates that the required CAR runway for takeoff for a typical 1,750 statute mile trip at

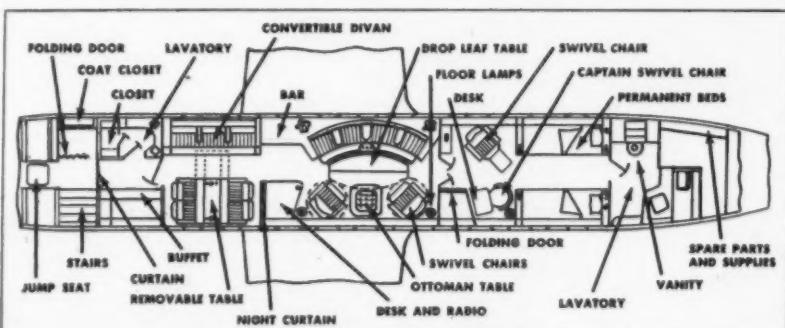
sea level standard conditions will be 4,950 feet. Runway required for landing with full first class payload and sea level standard conditions is set at 4,750 feet.

Convair presently is quoting \$3.9 million as the cost of a Model 600, including radio and galley. The GE CJ805-21 aft-fan engines are listed at \$205,000 each. GE is guaranteeing \$20 per hour per engine for engine maintenance materials.



AiResearch photo.

LAST WORD in airborne executive suites is U.S. Industries' 440.



CONVERTIBLE DIVAN, beds, bar, closets and vanity are designed into ultra-plush interior of company's "flying hotel and offices."

Garrett's \$90,000 Conversion

The interior of U.S. Industries' Convair 440 is virtually a flying hotel and corporation conference room.

By using many non-aviation materials and fabrics, the designer, Elfrida A. Snyder, of New York, has achieved an effect of home comfort combined with the business-like interior of an office. The \$90,000 conversion, carried out by AiResearch Aviation Service Div. of the Garrett Corp. won the 1958 Reading Aviation Service award

for the best executive aircraft interior in its class.

Much of the materials and fabrics installed in the aircraft were supplied by F. Schumacher & Co., while the seats were built by Burns Aero Seat Co., with the exception of the divan, crescent lounge and the captain's chair.

Standard Convair 440 lighting is installed but supplemented by additional table and floor lamps liberally placed throughout both main compartments.

NOW BEING DELIVERED— JET POWERED ELECTRA

The first prop-jet Lockheed Electras are being delivered this month for scheduled service before Christmas. Fourteen leading airlines throughout the world will inaugurate a new era of jet age service, performance and economy with the Electra in the months ahead. More than just a "new" airplane, the Electra offers your travelers a unique flying experience known as:

ELECTRA/FLIGHT



Purchased by:

*Aeronaves de Mexico • American Airlines • Ansett/ANA of Australia • Braniff Airways • Cathay-Pacific Airways
Eastern Air Lines • Garuda Indonesian Airways • KLM Royal Dutch Airlines • National Airlines • PSA-Pacific Southwest Airlines
Qantas Empire Airways • Tasman Empire Airways • Trans-Australia Airlines • Western Airlines*

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SEPT

ELECTRA/FLIGHT keeps you on schedule! Your customers can depend on Electra/Flights for on-time departures because the reliable Electra has complete "altitude flexibility" ranging from 5,000 to 25,000 feet. It can fly under or over the weather or traffic congestion.



ELECTRA/FLIGHT offers new enjoyment! Vibration-free, jet power smoothness lets travelers sleep comfortably... write or read with ease. Conversation of course is easy and pleasant on quiet Electra/Flights.



Passengers enjoy a big picture window panorama. The wide, spacious cabin allows for more comfortable seating and easy walking in the aisle, and provides space for more efficient stewardess service.



ELECTRA/FLIGHT offers new comfort! New radiant heating in the walls and floor surrounds passengers and crew with even-temperatured warmth. No-draft air conditioning (separate systems for cockpit and cabin) can operate on the ground also.

ELECTRA/FLIGHT saves time, in the air and on the ground. Four General Motors Allison Prop-Jet Engines whisk the Electra along at almost 7 miles a minute. Because the Electra reaches cruise altitude in a hurry, passengers spend less time "strapped in" on an Electra/Flight...have more freedom to enjoy the journey.

They save time at en route stops too...averaging just 12 minutes, thanks to new Lockheed servicing procedures and the Electra's large fuel capacity which permits fewer refuelings.

ELECTRA/FLIGHT permits service to more airports! Swift in the air, nimble on the ground, Electra brings the jet age to the smaller communities, too. It can serve over 1300 of today's airports located in all parts of the world.

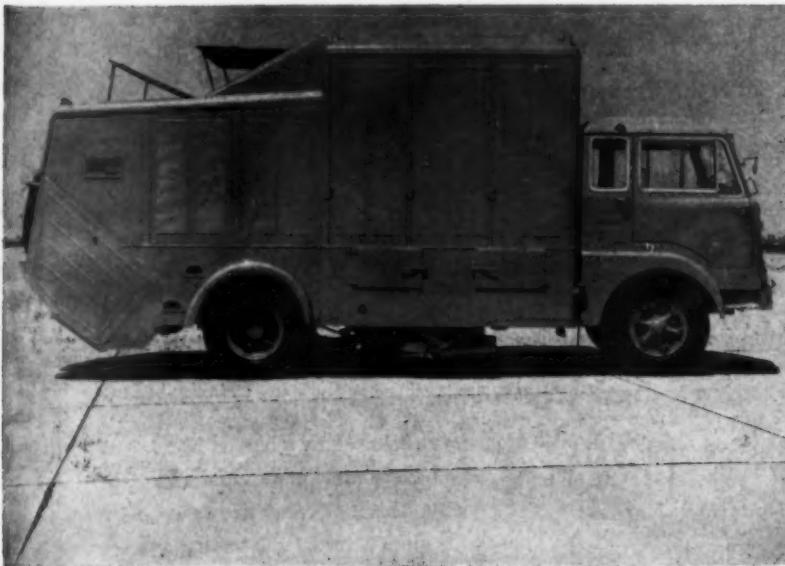


Performance as promised!

LOCKHEED ELECTRA

The finest city-to-city jet powered airliner... designed to assure you maximum return on every operating dollar.

MATERIALS & EQUIPMENT



Runway Sweeper

Introduced by Belotti of Genoa, Italy, Model B/5 is one of three sweepers which meets military specification S.26130. Sweeper can clear an 8-ft.-wide area with truck speeds up to nearly 30 mph. Drive unit is a 90-hp Fiat engine for the truck and a 108-hp Fiat engine for the sweeper.

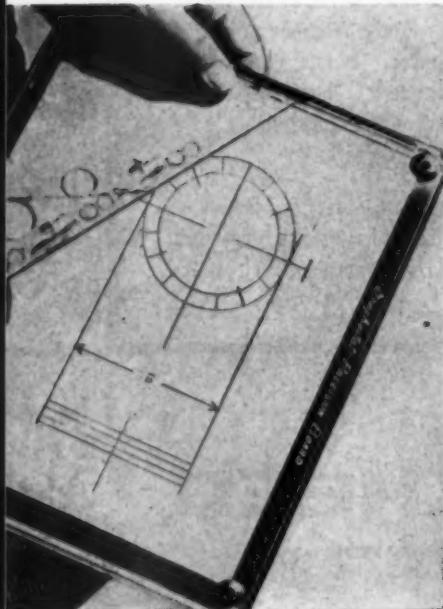
Circle No. 100 on Reader Service Card.



Jet Blast Deflector

Lynn Engineering Co. has developed a low-cost jet blast deflector. Prefabricated in sections, the deflector's structural framework supports special corrugated panels. Gaps are adjustable.

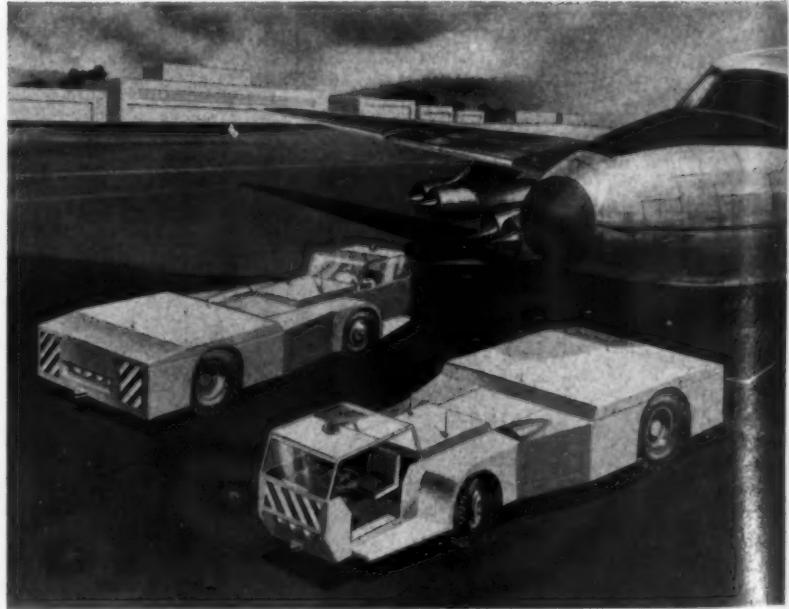
Circle No. 101 on Reader Service Card.



Portable Drawing Board

Molded of high impact polystyrene, 7½ oz., drawing board by Leslie Creations comes complete with two transparent plastic triangles. Outfit measures 10" x 12".

Circle No. 102 on Reader Service Card.



Jet Aircraft Towing Vehicle

Designed for the landing strip handling of commercial jet transports, the Titan Model ATV-42 is said to be capable of pulling aircraft weighing in excess of 300,000 lbs. Available on either purchase or lease plan, vehicle will be powered with a 231 hp V-8 engine and will feature a 6-speed transmission, the company says.

Circle No. 103 on Reader Service Card.



B. F. Goodrich Co. photo.

Reflector

Assembly. Height is approximately 9 ft. Price in quantity is about \$14 per lin. ft. and installation runs about \$4 per lin. ft. including footings.

Circle No. 101 on Reader Service Card.

Product Briefs

• **Aerial camera**—Designed specifically by the Mast Development Co. of Davenport, Ia. for aerial and telephoto photography, model 110 has a 10" focal length f/5.6 Raptar telephoto lens and uses 8 exposure Polaroid roll film in a standard Polaroid camera back which provides 60 sec. in-camera development of exposures. Aperture of the Graflex K-20 behind-the-lens shutter can be adjusted from f/5.6 to f/32. Shutter speeds are 1/125, 1/250 and 1/500 of a second. Dimensions are 5 3/8" x 9 5/8" x 11" and weight is 8 lbs. Two Wratten series 8 coated glass filters, a K-2 (yellow) and a K-25A (red), are available as optional equipment.

Circle No. 105 on Reader Service Card.

• **Aircraft skis**—Developed by Federal Ski & Engineering Corp., new "air-glide" ski is designed to utilize the cushioning effect of the tire to absorb much of the shock of landings and runs over rough, uneven snow surfaces. The tire rests on the upper surface of the ski board when the ski is in the down position. Available with either hydraulic or manual controls.

Circle No. 106 on Reader Service Card.

• **Motion picture data camera**—16 mm unit called the Thinform Model FDTF-

001 by Fairchild Data Devices Corp. is designed especially for flight test research. Measuring 1 1/4" x 8 1/2" x 7 11/16" without connector and weighing 4.4 lbs. without lens or film, camera operates at speeds of 16, 24, 32 or 64 frames per second. It has been tested to operate under the following environmental conditions: acceleration of 25 Gs on the three major axes; vibration of 20 to 55 cps at .060 d.a. and 56 to 500 cps at 10 Gs; 100,000 ft. altitude; temperatures from -65° to 150°F.

Circle No. 107 on Reader Service Card.

• **Aircraft storage battery**—Designed by Exide Industrial Div. of The Electric Storage Battery Co., model 14-S-100 silver-zinc unit is said to deliver an engine starting rate of 1,350 amps continuously for more than two minutes. Weighing 67 lbs. when filled with electrolyte, battery measures 10.25" x 9.75" x 10.31", has a rated capacity of 100 amp/hrs. and a rated power output of 95,000 w/min. at the one-hour discharge rate.

Circle No. 108 on Reader Service Card.

• **Drafting machine**—Introduced by Universal Drafting Machine Corp., X-Y track drafting unit provides graduated track settings in addition to usual angular and dimensional measure-

ments. Protractor head with full 360° visibility and graduations and automatic 15° index is attached.

Circle No. 109 on Reader Service Card.

• **Flight crew log**—Handy vestpocket-size flight crew log—trip and expense record by Small World Air Services—is designed to provide space for daily flight and expense information.

Circle No. 110 on Reader Service Card.

• **Radar range extender**—Developed by Zenith Radio Corp., new wide-band, low-noise, high-gain amplifier tube which company says will greatly extend effective range of military defense radars used in distant-early-warning systems. Measuring nearly 4 in. in length, amplifier is said to have a noise figure of about one decibel, with a gain up to 30 decibels.

Circle No. 111 on Reader Service Card.

• **Speed template compass**—Designed by F and H Mfg. Co., 2" ball-bearing action compass permits perfect circles from 1/4" to 2" in dia. to be drawn by inserting pencil or pen in the desired hole and spinning around the center. Measuring 3 3/8" x 4 1/4", compass is transparent and tinted. Two models available.

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Circle No. 9 on Reader Service Card.

LITERATURE

• **Portable plotter**—4-page Bulletin No. AP-810 describes and illustrates dual sensitivity inputs available in portable, table-top Model 1100E Varioplotter, used for a wide variety of control instrumentation applications. Electronic Associates, Inc.

Circle No. 175 on Reader Service Card.

• **Titanium fittings**—Brochure carries details on types of AN and MS finished titanium fittings and discusses applications, advantages and other technical data. Harvey Aluminum Corp.

Circle No. 176 on Reader Service Card.

• **Gyros**—64-page illustrated reference primer explains how gyros work, gyro terms and operating principles. Specifications for rate, free, directional and compensated vertical gyros are included. Ketay Dept., Norden Div., United Aircraft Corp.

Circle No. 177 on Reader Service Card.

• **Aircraft engineering**—8-page bulletin provides engineering data and information on Model 3200 series self-sealing coupling, designed for 3,000 psi aircraft hydraulic systems in accordance with MIL-C-25427. Aeroquip Corp.

Circle No. 178 on Reader Service Card.

• **Moving sidewalks**—8-page booklet describes three types of passenger conveyors manufactured by the company: carrier bed, slider bed and roller bed. Hewitt-Robins, Inc.

Circle No. 179 on Reader Service Card.

• **Timing instruments**—12-page catalog illustrates nearly 50 different models of stopwatches, chronographs, holders, timer boards and other timing instruments for a wide variety of applications. M. Ducommun Co.

Circle No. 180 on Reader Service Card.

• **Thermocouples**—28-page catalog describes and illustrates complete line of miniature thermocouples and gives applications, ordering and installation instructions. Various terminals and quick-coupling connectors are also illustrated. Temperature conversion tables are provided. Thermo Electric Co., Inc.

Circle No. 181 on Reader Service Card.

• **Adhesives**—23-page catalog lists official U.S. Government specifications for a wide variety of adhesives, coatings and sealers. Also listed are their definitions and the corresponding 3M adhesive, coating or sealer that meets these specifications. Minnesota Mining & Mfg. Co.

Circle No. 182 on Reader Service Card.

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*A Member of The ENGLISH ELECTRIC Aviation Group
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• **Teflon machining techniques**—10-page technical report outlines equipment and techniques required in machining Teflon plastic having tolerances of .001" and less, for the electronics, instrument, guided missile, mechanical and chemical fields. Tri-Point Plastics, Inc.

Circle No. 183 on Reader Service Card.

• **Rivets**—10-page catalog provides basic design and material specifications on series 6900 and 7900 drive-pin blind rivets used for aircraft construction applications. Included are installed weights, protrusion dimensions and driving sequence data for both the close tolerance and standard versions. Deutsch Fastener Corp.

Circle No. 184 on Reader Service Card.

• **Connectors**—40-page, 4-color catalog gives specifications, outline drawings, and general information of company's series 20 miniature connectors. Electronic Sales Div., DeJur-Amsco Corp. Circle No. 185 on Reader Service Card.

• **Electronic hardware**—75-page reference manual includes diagrams, dimensions and sizes of more than 100 types of standard parts available from stock. Other data includes tables listing physical properties of elements, physical properties of rubber, an atmospheric table, etc. Amaton Electronic Hardware Co., Inc.

Circle No. 186 on Reader Service Card.

• **Wires and cables**—16-page booklet contains a comprehensive listing of wires and cables for aircraft, with ratings ranging from 75 to 3,000v. General Electric Co.

Circle No. 187 on Reader Service Card.

• **Tachometer generators**—12-page engineering report describes test procedures and test equipment used in determining the stability, linearity and other characteristics of dc units. Servo-Tek Products Co.

Circle No. 188 on Reader Service Card.

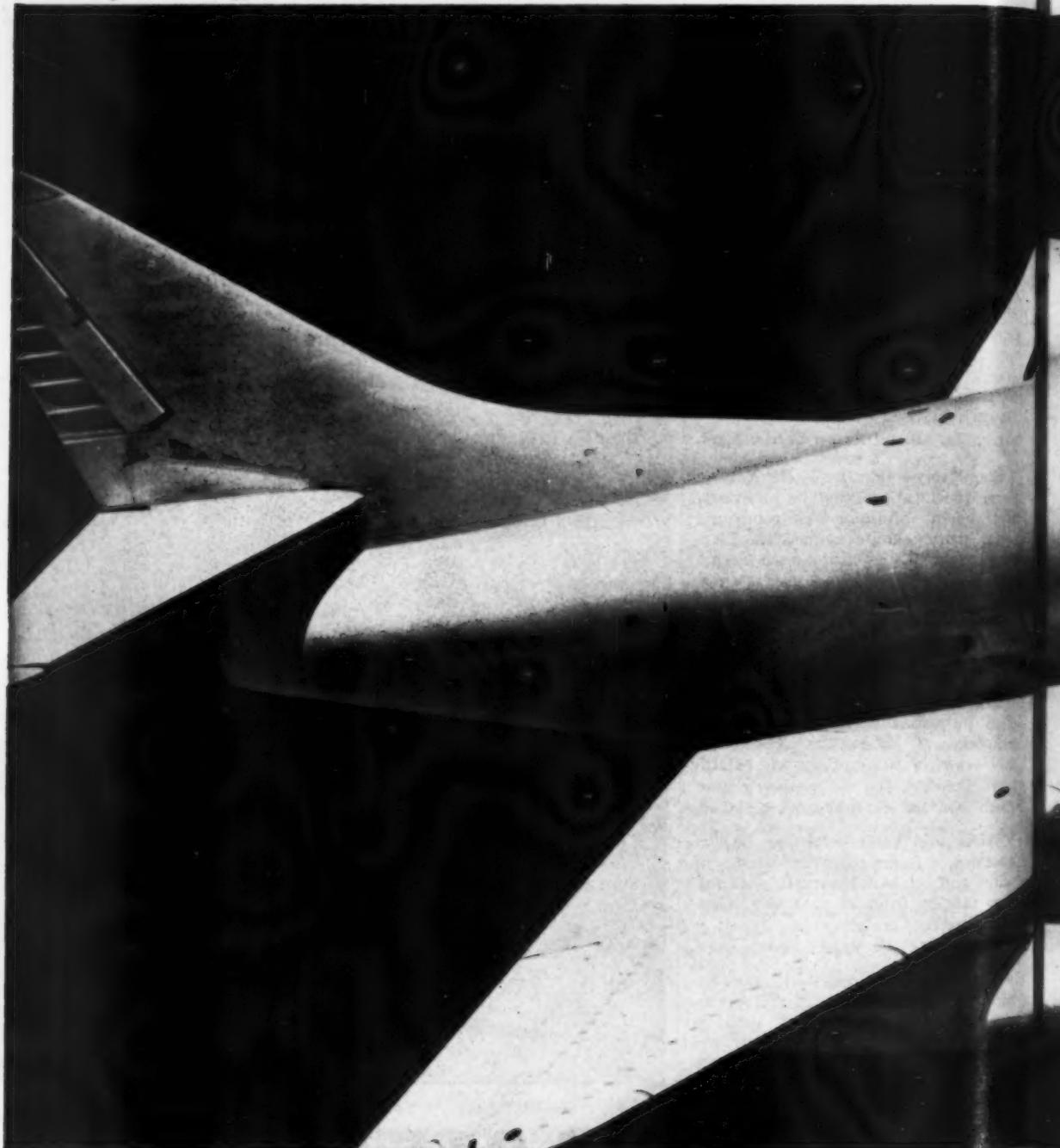
• **Forced-air cooling**—6-page technical booklet on cooling electronic equipment gives engineering information on thermal design. McLean Engineering Lab.

Circle No. 189 on Reader Service Card.

• **Alloy fabrication**—30-page booklet describes and illustrates fabricating techniques of alloys such as stainless steel, aluminum, monel, nickel, titanium and others in gages up to 3/8". S. Beckman, Inc.

Circle No. 190 on Reader Service Card.

Today's air power in action: *

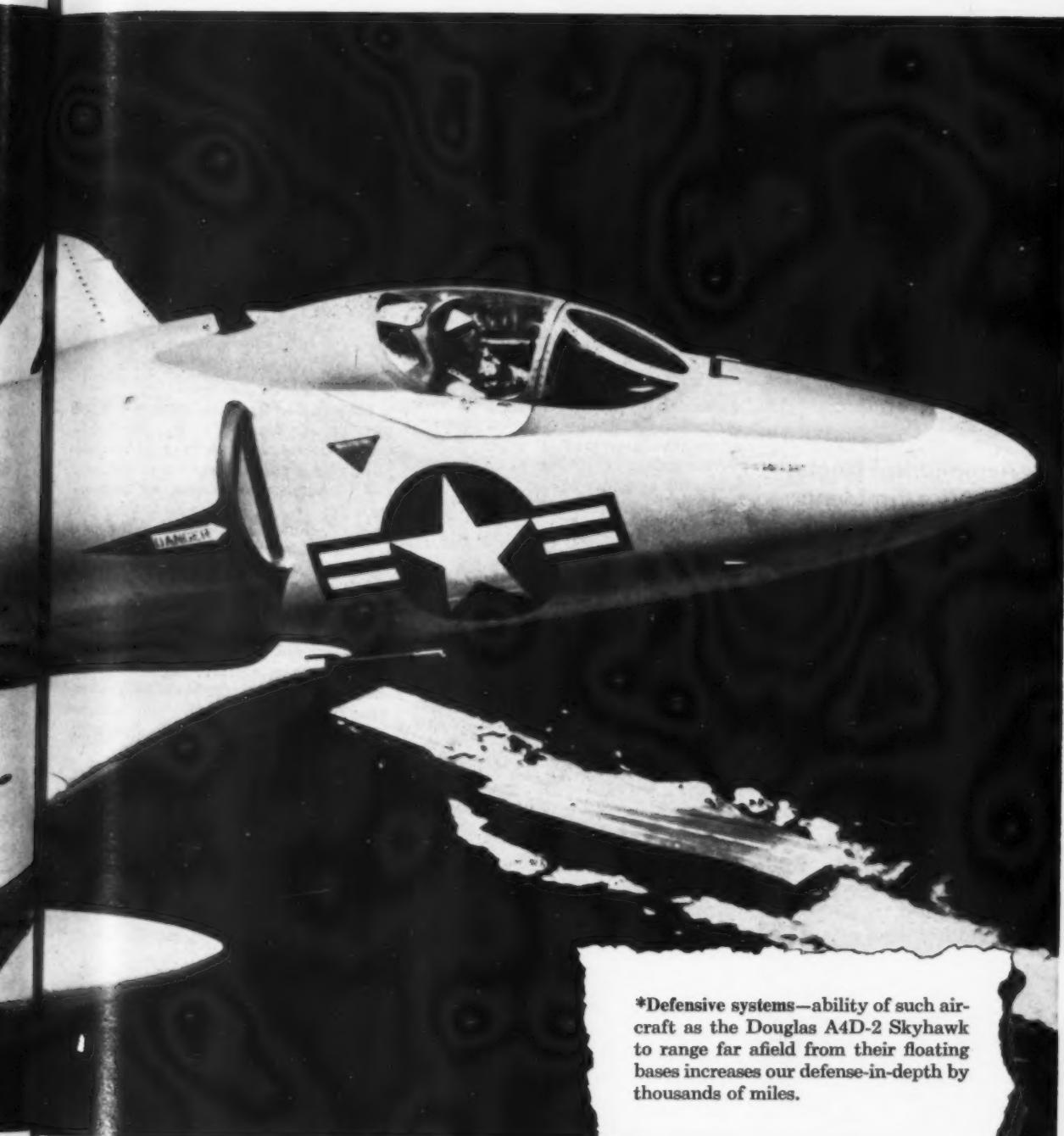


Carrier-based pocket bomber packs a nuclear punch

So compact that it serves aboard carriers without need of folding wings, the Douglas A4D-2 Skyhawk is the Navy's newest and most capable light attack aircraft.

Skyhawk has the low landing speeds required for

carrier operation, and combines the lift needed to take off with a nuclear weapon with the range required for its use at great distances. Its small size, speed and responsiveness make the Skyhawk an extremely difficult target for enemy interceptors.



*Defensive systems—ability of such aircraft as the Douglas A4D-2 Skyhawk to range far afield from their floating bases increases our defense-in-depth by thousands of miles.

The Douglas A4D-2 Skyhawk, known as the Mighty Midget, is the smallest, lightest U.S. jet combat aircraft. It can operate from small carriers or short "beachhead" fields.

or anti-aircraft. Numbers of Douglas Skyhawks are on active duty with U. S. carrier units now engaged in patrolling sensitive areas around the world. They are in service for both the Navy and Marine Corps.

SEPTEMBER 8, 1958

Depend on
DOUGLAS
*The most respected name
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—PEOPLE



H. E. Ryker

Ryan Aeronautical Names Two New Vice Presidents

C. A. Stillwagon and H. E. Ryker have been appointed vice presidents for finance and operations, respectively, of Ryan Aeronautical Co.

Stillwagon, who was formerly secretary-treasurer, joined Ryan 19 years ago as head of the Ryan School of Aeronautics accounting department. He is a past national director of the National Association of Accountants.

Ryker was for 15 years with Lockheed Aircraft Corp., where he was vice president—manufacturing and materiel. He was also an administrative consultant to the Hughes Aircraft Co.



Maj. Gen. Leighton I. Davis

Gen. Davis Named R&D Deputy Commander

Maj. Gen. Leighton I. Davis has been named deputy commander for research and development at the USAF Air Research and Development Com-

mand Headquarters, Andrews AFB, Md.

Davis will have control of scientific exploration programs and equipment development projects for the Air Force.

A graduate of the U.S. Military Academy, he received the Legion of Merit for developing electronic pressure-time and pressure-volume equipment for instructional purposes. This award was again given him when he helped design and develop a series of gun-bomb-rocket sights for fighters.

People on the move in . . . Manufacturing/Military

A. G. Handschumacher has been appointed to the newly-created position of corporate director of research and development for Rheem Mfg. Co. He will also continue in his post as vice president and general manager of Rheem's Electronics Div.

Felix A. Kalinski, vice president of Vertol Aircraft Corp., has been elected a member of the board of directors. He directs the company's engineering, customer relations, contracts and long-range planning activities.

Lear, Inc. has named **Roy J. Benech** as senior vice president and **James L. Anast**, **James P. Brown**, **K. Robert Hahn** and **Joseph M. Walsh** as vice presidents. All other officers of the company were re-elected.

W. G. Doran has been named director of materiel for the Douglas Aircraft Co., succeeding D. J. Bosio who died July 25.

John A. Rhoads has joined Packard-Bell Electronics Corp. as director of engineering in the Technical Products Div. He replaces **Dr. George J. Mueller**, who will remain at the company temporarily as consultant. A graduate of the University of California, where he received two technical degrees, Rhoads has had wide experience in government and private industry.

Morris M. Townsend has been elected president of Resort Airlines, Inc., succeeding **Harold L. Graham, Jr.** who has resigned. **Brig. Gen. Thomas B. Wilson** will continue as chairman of the board and chief executive officer.

Willis Player has been appointed to head the Public Relations Department of American Airlines, Inc., succeeding **Rex W. D. Smith, Jr.**, who has been vice president-public relations since 1946.

O. L. Slay has been named general sales manager of Alaska Airlines, Inc. He formally served as western regional manager for Slick Airways at Los Angeles.

Robert E. Pincus has been appointed director of Mycalex Electronics Corp. and Mycalex Tube Socket Corp., affiliated companies of Mycalex Corp. of America. He has been with the company since 1952 as controller and assistant treasurer.

Robert A. Bailey has been named director of marketing for the Industrial Products Div. of International Telephone and Telegraph Corp. He was formerly marketing manager at Norden-Ketay Corp.

Gilmore Industries, Inc. has named **Larry S. Winston** as vice president, sales. He was formerly with Greer Hydraulics, Inc. where he was sales engineering manager of Greer's Test Equipment Div.

Harold P. Field has been appointed director of marketing for the electronics operation of Stromberg-Carlson Div. of General Dynamics Corp. He will continue his duties as general manager of Stromberg-Carlson's San Diego facilities in addition to his new responsibilities.

Robert S. Miller has been named president of Kavamil Co., Inc. and also elected to the board of directors.

Maj. Gen. William T. Hudnall has been appointed director of maintenance engineering, Air Materiel Command, USAF. He succeeds **Maj. Gen. Merrill D. Burnside**, who will become a special assistant to the commander, AMC.

Robert B. Kimmach has been named assistant to the president in charge of sales of Helio Aircraft Corp.

Harold E. Francis has been appointed chief project engineer at Chandler-Evans, a division of Pratt & Whitney. He was formerly senior staff engineer and prior to that was assistant chief engineer at Wright Aeronautical Div., Curtiss-Wright.

Chester A. Hill has been elected vice president and assistant treasurer of Aerojet-General Corp., succeeding Tracy S. Clark, who retired as treasurer of General Tire & Rubber.

William Jaroszak has been named as assistant to the president of Midland Aircraft Corp., manufacturers of fasteners and special hardware for the aircraft industry.

International Rectifier Corp. has appointed **J. T. Cataldo** vice president in charge of sales. He was formerly sales manager and assistant general manager and, prior to that, project advisor responsible for research and development activities at the Signal Corps Engineering Laboratories at Fort Monmouth, N.J.

H. Max Healey has been appointed general manager of Cia. Mexicana de

Aviacion. He has been serving since April as deputy for the board and succeeds **Elton R. Silliman** who is retiring for health reasons.

Porter H. Stiles has been appointed agency and interline sales manager of Avianca (Colombia National Airways).

Dr. William J. Pientenpol has been named vice president and general manager of Sylvania's Semiconductor Div. He will be responsible for all divisional operations, including research and development, manufacturing and marketing.

Canadian Pratt & Whitney Aircraft Co., Ltd. has appointed **T. E. Stephenson** executive vice-president. He will be responsible to the president for the general administration of all the company's activities.

R. W. Martin has joined Burton Mfg. Co. as director of engineering and sales. He was formerly president of Physical Measurements Corp., a subsidiary of Technology Instruments Corp.

... Transport

Walter H. Johnson, Jr. has been named vice president—marketing of Capital Airlines and will have overall charge of the company's traffic, sales research, advertising, passenger service and hostess dept. He was also named a member of the board of directors. He formerly was vice president in charge of passenger sales of American Airlines.

H. Don Reynolds has joined American Airlines as general traffic manager, a newly created position within the sales department. He will report directly to Charles A. Rheinstrom, executive vice president, sales.

John L. Higgins has been appointed a vice president of the Flying Tiger Line. He will be in charge of the company's domestic and international sales organization, including both air freight and contract operations. **George T. Cussen**, formerly vice president of sales at the airline's headquarters in Burlenk, has been named regional vice president at San Francisco.

Andrew Shiland, Jr., has been named general manager in the U.S. for TSA-Transcontinental, an independent Argentine airline. Don L. Urquhart, a 20-year veteran with American Airlines, has been named North American sales manager.

Hector Font Viale-Rigo has been elected president of LAV, the Venezuelan Airline. Formerly vice president of the airline, he succeeds Colonel Antonio Briceno Linares, who has been appointed chief of the Venezuelan Air Force.



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JET-PROP BRITANNIA

**now flying 2 million miles
a month on world air routes**

**FLIGHT CREWS, AERO-ENGINEERS, OPERATORS, TRAVELLERS,
ALL ACCLAIM THE "WHISPERING GIANT'S" REMARKABLE RECORD**



Canadian Pacific

In the air routes of the world, the Britannia has paved a trail of success.

Flight crews have expressed great confidence in the Britannia. Airline engineers have praised the reliability of its fine Bristol Proteus jet-props. Operators have been impressed by the exceptional operational economy of the Britannia and its remarkable versatility. Passengers have welcomed the speed, luxury, and smooth, quiet comfort of the "Whispering Giant."

World-wide service by Britannia

Today, Britannias are flying more than two million miles a month, serving five continents with Canadian Pacific, OAC, El Al and Aeronaves.

Further Britannias have been ordered by Cubana de Aviacion, Hunting-Clan Air Transport, Air Charter Ltd, the British Ministry of Supply and the Royal Air Force.

A remarkable record

Britannias hold many commercial records. They have broken transatlantic speed records between London and

New York no less than eight times. They have clipped hours off scheduled flights on trans-oceanic, trans-continental, and inter-city routes.

Equally spectacular is the record of the Proteus jet-prop. The overhaul life of the Proteus 705 reached 1,600 hours in less than 18 months of airline operation—the most rapid extension in aviation history.

All in all, the Britannia's in-service record has proved a great triumph, acknowledged by the flight crews, aero-engineers, operators, and travellers of the world.

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Lazy Pilots Live Longer With Lear's LIFE

Breathes there a pilot with soul so dead who never to himself hath said: "Boy, there must be an easier way!"

Lear Inc.'s new integrated flight system (it spells LIFE when you say Lear's integrated flight equipment) is for lazy pilots. How many times have you heard a pilot brag about his being the laziest man in the world? Then he starts complaining about too many gadgets, too many instruments, too much spinach on the control panel. He's not REALLY lazy. He just resents all the stuff he has to stare at.

Bill Lear, who knows a thing or two

about flying planes, was no different from most when he authorized the development of the system which couples the company's L-5 autopilot with the equipment which enables two instruments to represent flight information normally presented on at least six different instruments in the cockpit. And the total weight of the LIFE system is only 76 lbs.

How does LIFE reduce the pilot's workload?

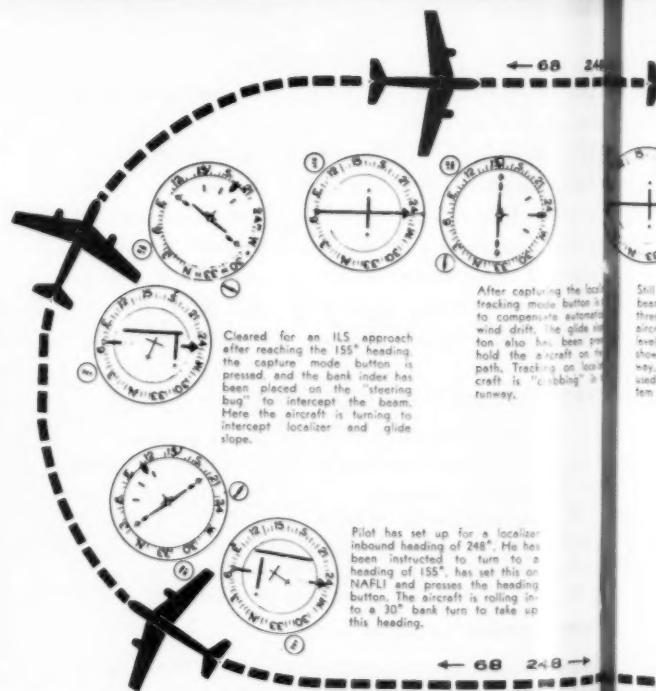
A mode selector is used for both LIFE and the L-5 autopilot. Upper of the two LIFE instruments on the panel

is the attitude/command NAFLI (natural flight) director. This consists of a heading index which the pilot sets at the required point on the magnetically slaved azimuth card. As the aircraft is turned to the selected heading, the index turns with the card to become the heading reference.

A press of the heading button on the mode selector causes the later command "steering bug" to swing over—up to 30 degrees in the direction in which the turn is to be made to the selected heading. Flying manually or with the autopilot, the bank index

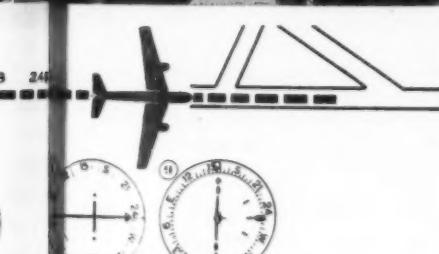


PILOT BOB MAYS USED THE LIFE SYSTEM to demonstrate, step by step, a typical ILS approach with a Twin Beech.



is placed on the steering bug and kept there. As the aircraft comes around to the required heading, the "bug attaches itself" to the heading index and starts moving back to a vertical position. Since the bank index is being held on the "bug," the result is an exceptionally smooth roll out of the turn.

A major feature of the NAFLI Director is the unconventional method of showing aircraft attitude. The pictorial airplane moves instead of the artificial horizon. The airplane wing tips go up or down relative to the pitch command "tip tanks" to portray a climbing or diving attitude. Roll is indicated by the relationship of the bank index to the bank reference marks etched on the dial glass.



Still climbing, but right on the beam, the aircraft over threshold. NAFLI indicator shows aircraft glide slope with wings level. Situation display indicator shows pitch angle line-up with runway. Bug is attached to central wheel. The L-S/LIFE system for

It's as if the pilot were looking at his own aircraft from behind. The pitch trim control in the lower right corner of the indicator is used to adjust the pictorial aircraft to the required pitch attitude.

When you push the glide slope button on the mode selector, the "tanks" line up with the wing tips and, under these circumstances, their position relative to the vertical path reference markers tells you your position relative to the glide path.

The lower LIFE instrument is the situation display indicator. To make an ILS approach, you set the selected course index to the localizer inbound heading on the magnetically slaved azimuth card with which this unit also

is equipped. If you are off to one side of the localizer, the course displacement bar will be deflected, and your relative position will be shown by the aircraft reference etched on the glass of the instrument.

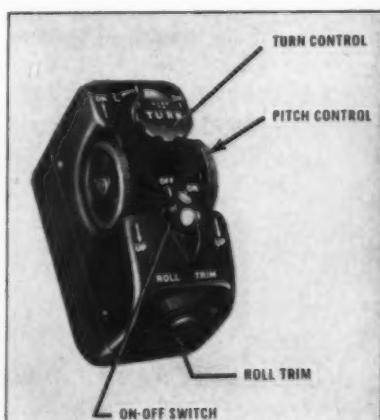
By pressing the flight instrument button on the mode selector, the pilot can turn off the steering bug while the NAFLI Director continues to display pitch, roll and direction information. But let's suppose the pilot is set up for an ILS approach. He has pressed the cancel button to release the autopilot from holding the altitude at which the aircraft was when he pressed the altitude button last. Now he can set up an approach such as that shown here.



UPPER OF THE TWO LIFE instruments on the panel is the attitude/command NAFLI (natural flight) director. Lower is the situation display indicator.



PUSHBUTTON MODE SELECTOR is a key component in new LIFE system.



L-5 AUTOPILOT controller is used in conjunction with LIFE system.

Air Drive Can Take the Tumble Out

- AIM pins high hopes on artificial horizon and gyro
- Texas firm's indicators to be used by Aero Design
- New approaches to old navigation problems fruitful

Of several new instruments developed by the Aviation Instrument Manufacturing Corp. of Houston, Tex. in an effort to fill important gaps in the navigation and safety of aircraft, two are expected to attract the most attention.

At least, that's what Everett Anderson, president and founder of the six-year-old company, thinks. One of the new instruments is the Model 643-S, a small air-driven artificial horizon. The other, Model 213, is an equally small air-driven directional gyro.

Each has operational and maintenance advantages comparable to those of the small electrically-driven instruments. Anderson believes his company is the first in the U.S. to make available an air-driven gyro which fits the 3 1/8-inch panel cutout standard for other cockpit instruments.

Use of the small gyro instrument makes it interchangeable with the location of most other instruments on the panel. The present standard-size horizon and directional gyros both require larger panel space than most instruments, and thus their locations are not interchangeable. Anderson points out the directional gyro of standard proportions has a frontal surface of 22 sq. in.; AIM's gyro requires only 11 precious square inches of the cockpit panel frontage.

Like the electrically-driven instruments, the AIM horizon and directional gyro are virtually tumble-free. The gimbaling permits 85-degree freedom

of climb and dive, and 360-degree travel on the other axes.

Rebuilt surplus horizons tilt at 55 degrees and the gyro at 90 degrees.

Once tilted, the gyros take a long time to erect, then must be leveled; but AIM's new air-driven instruments are self-erecting within a few seconds. Should the aircraft turn over on its back the gyros still won't tumble, but Anderson concedes the readings will be reversed.

- Maintenance costs lower—Maintenance is a less expensive and an insignificant matter with the AIM small instruments, says Anderson. For one thing, they are all-new instruments from the case to the rotor shaft, the first new air-driven directional gyros and horizons since World War II.

All other current air-driven instruments are rebuilt from World War II stock. The horizon and directional gyro are the only instrument panel "regulars" still tied to war surplus materials.

AIM's Model 213 directional gyro has a vertical card presentation of the 360-degree compass rose. This is in line with modern presentations on other instruments, Anderson points out, such as the modern gyrosyn compass.

By adding marks to the outer ring 45 degrees from the top center of the vertical card gyro, it can be used for 45-degree IFR procedure turns, Anderson points out. He said he expects future production will have this addition.

The control knob for setting the little airplane in the center of AIM's Model 643-S horizon has more travel than on the rebuilt war surplus instruments. The knob has no stop. It can be rotated through complete circles (or ovals) while the plane in the center of the instrument moves to the top of its travel and then to the bottom.

Both new AIM indicators will be standard on Aero Design's new pressurized Alticruiser, which recently reached the flight-testing stage, Anderson disclosed. They have also been adopted for the Aero Commander 680-E, the Pac-Aero Learspar and the Howard Super Ventura.

Models of the instruments also are on trial with Beech and Cessna. Anderson said the AIM instruments had been designated for the Cessna 620 before that project was canceled.

Cost of each instrument is \$495.

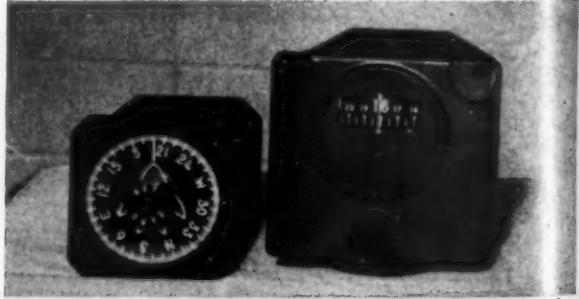
- Engine failure warning device—AIM also produces an unusual engine-thrust device which notifies a pilot when a faltering engine is losing power or fails and begins to drag on the plane. The device, called "Safeather," reports the shift from thrust to drag by a light installed inside the feathering button. It shows the pilot which button to push, and lights up at the instant it is time to feather the prop.

Heart of the device is a sensing mechanism that measures the direction of the strain on an engine mount. When the direction of this strain reverses, a simple mechanical and electrical linkage lights the feathering button.

AIM's Safeather is CAA-approved for the Beech 18 series, the Cessna 310, the Howard Super Ventura and,



AIR-DRIVEN artificial horizon made by Aviation Instrument Manufacturing Corp., Houston, Tex. is said to be virtually tumble-free, requires less panel space than standard horizons.



Aviation Instrument Mfg. Corp. photo. AIM'S MODEL 213 directional gyro has a vertical card presentation of the 360-degree compass rose, like a gyrosyn compass. Gimbaling permits 85-degree freedom of climb and dive.

at clavaids

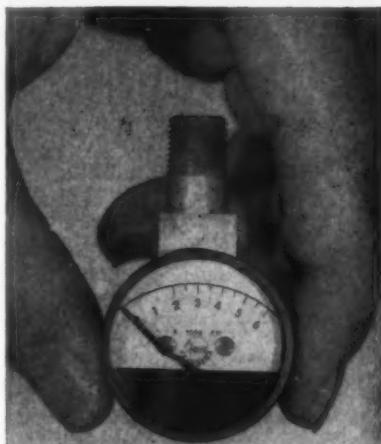
more recently, for the DC-4. CAA certification for Safeather installation on the DC-3 is in process, Anderson said.

Total weight for two engines is four pounds—for four engines, eight pounds.

The company has also subcontracted for Wilcox, on its runway bearing selector, rotating card ADF (automatic

radio direction finder) with single and dual indications, and directional reference units using standard gyros with pygmy autosyn to feed the directive signals into the Wilcox CAT (computing automatic tracker).

In May 1957, the company adopted its present name, Aviation Instrument Manufacturing Corp., and moved to the Brown & Root hangar near the south end of Houston International Airport. Designer Richard Shappee is vice president, and founder Anderson is president.



Glassco Instrument Co. photo.

GLASSCO-PRODUCED GAGE covers a pressure range of 0-6000 psi yet weighs only 0.05 pound.

the instrument. In addition, tube size, alloy and wall thickness also will vary with the range of pressures and overall gage dimensions.

Tubing for the Bourdon unit is manufactured to the company's specifications, but Glassco fabricates the rest of the unit, including winding the coil.

Although the company has a line of off-the-shelf gages, research and development on Bourdon helix types have enabled it to quickly produce instruments of pressure ranges from 15 to 50,000 psi and of nearly any size or weight.

Designed for the most severe shock and vibration conditions in aircraft and ground handling equipment, the gages can be built to a tolerance of one-half of one percent—if the customer wants to pay for it,” says Glassco.

Because the Bourdon helix operates essentially as “reading at one end and indicating at the other,” no service or adjustment is required during the instrument’s specified normal life.

Small Firm Solves Big Problems

Glassco's specialty is making pressure gages to fulfill highly specialized requirements

Ten employees and a gross of \$100,000 a year wouldn't qualify any company for the industrial big league, but Glassco Instrument Co. of Pasadena, Calif., is beginning to make a name for itself in the minors by specializing in the solution of unusual pressure-gage problems.

The company has been able to find successful answers to such problems as the requirements of one customer who discovered it necessary to put a 0-5,000 psi fluid-pressure gage in a hole less than one inch deep—including the fittings and all necessary shock mountings.

In another application, an Air Force fighter was experiencing difficulties with a gage that was supposed to read a basic 500 psi hydraulic accumulator pressure, but the same instrument had to withstand surges in operational system pressure up to 3,000 psi.

When the requests for a replacement gage were let out, Glassco's pro-

posal was accepted over those of approximately a dozen major gage manufacturers. The resulting instrument, based on the Bourdon helix principle, is now in production. (A Bourdon gage is a manometer consisting essentially of a blind curved elastic tube, oval in section, open at one end to the gas, steam, etc. whose pressure is to be registered.)

Owner Robert B. Glassco points out that the Bourdon helix type of gage is “not the best answer to all applications,” but it does have the most versatility in design, and “you can put the fittings anywhere you feel like it.”

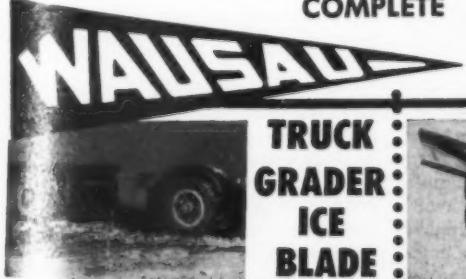
Also, it is said to be the most inherently accurate type of pressure-reading gage since the only limitation is in the alloy of the Bourdon tube itself. There are no mechanical links to create or multiply errors.

The coiled tube varies in length from six inches to about 20 inches, depending upon the specific requirements of

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—WEST COAST TALK—

By Fred S. Hunter

Don't be surprised if you hear that Douglas has a couple of takers about ready to sign up for its proposed DC-7 conversion program. With little, if any, resale market for present types of DC-7s in sight, airlines are showing more interest in this possible disposition of their equipment problem. Domestic DC-7s could be beefed up and turned into airfreighters either with or without upgrading to turboprop power. DC-7s could be speeded up to 400 mph with turboprops and filled with seats for economy fare markets.

True, the cost of a full-scale conversion of a DC-7 into a cargo job, including a set of Allison turboprop engines and propellers, big doors, heavier gear and beefed-up wing, fuselage and tail, would approach \$2 million. But this would drop, should Douglas get enough orders to obtain the benefits of production-line efficiency. Some of the cost also could be recovered from the sale of the present piston engines. And, since American Airlines has broken the ice with its agreement with Allison for unit exchange of turboprop engines for its Lockheed Electras, this would appear to be a third avenue of cutting down on the required investment. A turboprop airfreighter conversion conceivably could come out at something over \$1 million, but a passenger job, which would require less structural work, might run well under \$1 million.

• **Longer-range 707 talk** — Boeing hasn't released specific figures on its proposed still-longer-range Boeing 707, but it is understood to have engaged in discussions of a 311,000-lb. aircraft in its negotiations with Philippine Air Lines. This version of the 707-320 would make use of Pratt & Whitney's advanced thrust JT4A-9, which presumably is a 1961 engine. Seattle advises indicate all Boeing 320s (or 420s) can be changed over to the even longer-range model with fairly simple kits, when the engine power is available, because allowances for higher weights and powers have been engineered into the basic configuration of the aircraft.

• **Livening things up** — Something new is being added to put more glamour into the Air Force Gunnery Meet,

which will be held at Nellis Air Force Base (Las Vegas), Oct. 13 to 17. In the periods between team firings and droppings, spectators will be treated to flight demonstrations of such century aircraft as North American's F-100, McDonnell's F-101, Lockheed's F-104 and Republic's F-105. There will also be live demonstrations of missile firings, inflight refueling, low-altitude bombing and aerial acrobatics, the latter by the Air Force Thunderbirds and the Air National Guard Minutemen. In addition, a static display is scheduled to be staged in Las Vegas with the following companies already in the fold: North American, Northrop, Hughes, Temco, Lockheed, Martin, Borg-Warner, Pratt & Whitney, the Garrett Corp., Bill Jack Scientific, Minneapolis-Honeywell, Cessna, Westinghouse and Douglas.

• **Crossfield to take 2Gs** — Scott Crossfield, North American Aviation's space pilot, will undergo 2G loads in the X-15, but this is substantially less than Al Blackburn withstood in the zero launching of the F-100. A Zel launching whips the forces on the pilot up to 3½ to 4Gs. Even so, says Blackburn, an ex-Marine pilot, the Zel launching is not so tough as a catapult from a carrier. North American, incidentally, is a little ahead of schedule on the X-15 and may roll it out in mid-October instead of Oct. 31 as originally scheduled.

• **Northrop workers encouraged** — Northrop Aircraft workers were given quite a lift by President Whitley C. Collins' expression of faith in the T-38 supersonic trainer made in his recent report on the outlook of the company. Once the twin-jet gets rolling, production, he said, could run into thousands.

• **Odds and ends** — The CAB renewed Los Angeles Airways' certificate for seven years, but the helicopter carrier is confidently basing its expansion program on a 10-year span . . . To illustrate how difficult the air-space problem has become, Kelly Johnson at Lockheed points out that it takes just eight minutes for an F-104 to fly from the Mexican border to Bakersfield . . . Barmotive Products has an application in to the CAA for a type certificate for its Nelson H-63B engine intended for use in the Hiller Rotocycle.

AIRTRENDS

Key operating post of Air Traffic Control Association will change hands Oct. 1 with resignation of executive director Clifford P. Burton. Stanley L. Seltzer, ATC specialist with the Air Transport Association is being drafted for the job and will accept if the terms are right.

Burton, a retired CAA official, knows the ATC ropes well, has done an excellent job in steering the relatively young ATCA to a membership of 5,500 in 28 months. As a military reservist and ex-CAA man, he should rank high among candidates for a Federal Aviation Agency traffic control post.

ATCA's gain, if Seltzer accepts executive directorship, will be ATA's loss. A former head of CAA's traffic control at Washington National Airport, he has been one of the strongest behind-the-scene influences at ATA in bringing about much-needed attention to the ATC problem.

When the Civil Aeronautics Board found a few weeks ago that the government itself was at fault in the Las Vegas air collision that cost the lives of 49 persons, it set the stage for major suits for damages by the families of those killed. United Air Lines, whose DC-7 was carrying 42 passengers and five crew members from Los Angeles to New York, will not say how many damage suits have been filed, but the total is expected to be several million dollars.

The CAB said "the probable cause of this collision was a high rate of near head-on closure at high altitude; human and cockpit limitations; and the failure of Nellis Air Force Base and the Civil Aeronautics Administration to take every measure to reduce a known collision exposure."

As if this didn't put the cat firmly enough on the government's back, the CAB also said in its 37-page report on the crash between the transport and an Air Force jet that "the Board believes that the CAA exercised poor judgment in failing to take any action with respect to conditions that existed on the airway structure which impaired visual collision avoidance and created unnecessary collision exposure."

The CAA issued a general denial that it had failed to take the proper corrective action, and, in turn, pointed the finger back at the CAB for "not giving the CAA effective regulatory authority." All of which makes the job of attorneys working for the plaintiffs much easier, and takes a great deal of pressure off United in defense of the suits being filed.

First of the small-business investment companies authorized by the Congress in the Small Business Investment Act ought to be getting their licenses from SBA in mid-November. SBA is drafting the regulations which are a necessary first step and which should be printed in the Federal Register in mid-October.

Investment companies participating in the program will need a minimum of \$500,000 in paid-in capital to get started. However, SBA can lend up to 50% of the basic requirement. In addition, it can make loans up to 50% of paid-in capital and surplus. Loans will be made in most cases by the purchase of long-term debentures issued by small companies, which are convertible into capital stock.

The investment companies may be subsidiaries of banks and other investment companies. State and local development companies can also qualify.

Sen. A. S. (Mike) Monroney (D. Okla.), sponsor of the Airport Aid Bill and leader in the fight for its passage, took a healthy swipe at President Eisenhower when he learned of the President's pocket veto of the measure. Said the gentleman from Oklahoma, fairly seething with rage:

"The President's veto of the Federal Aid to Airports Bill strikes a body blow to air safety. Not only does his action endanger a safe transition to the jet air age, but it also jeopardizes the investment of more than \$2 billion in these advanced types of airplanes already on order by commercial airlines."

Monroney pointed out that the President himself had urged the creation of a modern aviation agency set up through the passage of the Federal Aviation Act of 1958 and that Congress had provided him with the legislation he desired.

AIRTRENDS

Eisenhower Administration carried its anti-federal-aid to airports position all the way to the pocket-veto deadline last week before issuing a memo of disapproval (veto). The new airport bill, which unfortunately became a political football, drops by \$37 million the funds badly needed to modernize airports for jet operations during fiscal '59. CAA is left with \$63 million, instead of \$100 million, in matching funds this year under existing airport aid legislation that expires next June 30.

Veto, as Sen. Mike Munroney (D.-Okla.) points out in blast at Eisenhower (see page 49) is inconsistent with President's expressed desire to promote air safety through creation of new Federal Aviation Agency.

Boeing 707 certification was imminent at presstime, but a hassle over field lengths at which it would be certified remained the major item to be resolved. Boeing jet initially was scheduled to be CAA-approved by August 15, but final type board meeting, a prerequisite to certification, did not take place until September 2.

A new jet requirement, reportedly in the talking stages in CAA, might call for installation of skids or retractable wheels on the lower side of jet pods for added protection during crosswind landings. CAA activity is understood to stem from 707 experience numbering three or four instances of scraping pods on runways, but more specifically from occasion involving a landing by a PAA pilot in an eight-knot crosswind with a CAA inspector on board.

Problem is one of pod-to-ground clearance if wing is dipped just before touchdown to correct for crosswind. Boeing 707 outboard pod has a five foot ground clearance, the Convair 600 3.5 ft. and the DC-8 six feet. But CAA action on an item of this scope, if it comes, would be a Washington engineering policy decision, and it hasn't progressed beyond the regional level at this point.

Airports in some 29 cities can look to some turbine fueling operations when American Airlines gets its fleet of Lockheed, Boeing and Convair turboprops and jets in serv-

ice. AA has named fuel suppliers at these points in awarding contracts for four billion gallons of kerosene extending over next 10 years:

Baltimore—Esso	Nashville—Esso
Boston—Esso	Newark—Esso
Buffalo—Gulf	New York—Esso
Chicago—Shell	Okla. City—Magnolia
Cincinnati—Std. Oil of Kentucky	Philadelphia—Esso
Cleveland—Sohio	Phoenix—Richfield
Dallas—Humble	Rochester—Gulf
Detroit—Gulf	San Diego—Richfield
El Paso—Humble	San Francisco—Shell
Fort Worth—Humble	St. Louis—Shell
Hartford—Esso	Syracuse—Gulf
Los Angeles—Richfield	Toronto—Shell
Louisville—Std. Oil of Kentucky	Tucson—Richfield
Memphis—Esso	Tulsa—Texas Co.
	Washington—Esso

Shortage of modern ATC facilities continues to strangle local service operations under IFR conditions. Instead of improving, situation is getting worse and CAA inability to cope with the problem spells an even darker future. The proof: For one east coast operator, July was the worst month in its history. It suffered 3,000 individual ATC holds totaling 500 hrs. of delay. This represents the equivalent of the utilization of three aircraft in its fleet.

Airport briefs: Allegheny Airlines shifts operations from Willow Run to Detroit Metropolitan (formerly Wayne Major) Airport on October 1. **New Port Columbus (Ohio) Air Terminal** will be dedicated September 21. **Land-clearing and demolition** for Washington International Airport at Chantilly, Va. got underway on September 2. **Miami circuit court** ruled in favor of Dade County Port Authority denying injunction against construction of a 250-room hotel atop new Miami International Airport terminal. **Chicago Helicopter Airways** carried more than 10,000 passengers in the first 26 days of August.

At the month-end, CHA was estimating its August total at 11,500 passengers. **New York Airways** was not far behind. It carried 11,143 passengers, an average of 359 a day, despite cancellations of 4,335 available seats due to weather.

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AIRTRENDS

Despite what you may hear or read about Capital Airlines, there are no big plans in the offing, such as a merger with Northeast. Latter may come about some day, but not as long as NEA has to operate its short-haul New England network without subsidy (Capital has enough small stops now). Capital is still working on a better financing arrangement for its Viscounts, is moving ahead with plans to acquire some Convair 880s (either with GE or Rolls-Royce Avon engines), and is attacking cost and route problems.

David Baker, the former USAF major general, is very much in the management saddle as president. And George R. Hann, the Pittsburgh attorney and large stockholder, who picked Baker, is very much in control of the Capital board. Charles Murchison, general counsel and director, is the single largest stockholder with 61,332 shares as of July, and his plans are currently a mystery. He is a factor to be reckoned with, but he doesn't control, and probably would have to wage a stockholder's proxy battle to do so. But at the moment there is nothing to indicate a management split. The airline hasn't been doing too badly of late although it has plenty of problems ahead. Recent management moves (and there may be more) included upping of Ray Lochiel to senior vice president, handling financial matters, and bringing in Walter Johnson from American Airlines as senior vice president-marketing, in charge of sales, traffic, sales research, advertising, passenger service and hostess departments. Baker has adjusted himself to the airline business and apparently likes it, but he's had his hands full since he came on the job last year.

Will airlines propose higher fares on jets?

Braniff Airways thinks an extra charge will be necessary, both domestically and internationally. It filed a tariff with CAB for a jet "service charge" of 15% of the adult one-way fare, first-class or coach, to become effective when it opens service in 1960. Braniff says that on domestic routes cost per available seat-mile for Boeing 707 will be 19% greater than DC-6, about 30% more than DC-7C. Tariff was

filed 16 months in advance in an attempt to get the matter settled early.

American Airlines, which will be first in domestic field with jets, has been studying the fare situation for three months, and doesn't expect to come up with any answers for about another month. Pan American World Airways, scheduled to open transatlantic service soon, plans the same fares as on piston-engined planes. International fares for jets will come up for discussion at International Air Transport Association's traffic conference meeting in Cannes this month.

Engine leasing deals, similar to those concluded recently by American Airlines, may be the method by which local service lines can buy more planes under the \$5-million limit on guaranteed loans to any one carrier. By eliminating the need to borrow money for engines, locals could put loan funds toward purchase of more airframes. Engine leasing isn't new in local service field. Allegheny Airlines, for example, has leased engines for its Martins for some time. AAA's arrangement with Air Carrier Engine Service Inc., Miami, has been highly satisfactory, the airline's officials say.

First domestic jet service by American Airlines with Boeing 707s has been set back to "about the first of the year." Reason: Receipt of provisionally-certified aircraft for training has been delayed from September 1 to October 15 in order to incorporate certain changes desired by AA on the Boeing production line.

Meanwhile, American's nearest competitor with domestic jets, TWA, saw its first two 707-120s move onto the final assembly line at Boeing.

But the distinction of being first in service with jets could wind up with another carrier, National, if top-level negotiations with Pan American on an equipment exchange work out. NAL and PAA reportedly are talking a jet leasing deal in which National may find itself with three daily Boeing 707 roundtrips New York-Florida during the upcoming season. When National gets its Douglas DC-8s, Florida off-

—TRANSPORT/AIRTRENDS—

season slack could be compensated for by a reciprocal lease to PAA to meet peak transatlantic summer demands.

The National/Pan American talks are not confined to equipment leasing. Officials of the two airlines reportedly are negotiating an exchange of stock, possibly involving as many as 300,000 shares. Although details could not be learned, it is known that the talks have progressed for a number of weeks and are still active. Obviously, any such agreement between the two carriers would have far-reaching effects and certainly would solidify National's future on the domestic scene.

Significant CAB order on local service mail pay has been issued by CAB.

In provisional findings in Mohawk rate case, Board modified its policy on re-equipment, said it will underwrite DC-3 replacements if made slowly, cautiously, and only after careful analysis indicates that the proposed new equipment is appropriate to the particular carrier's specific needs and can be utilized in an economic manner.

CAB recognized that no local can attain self-sufficiency with DC-3s, that it's a step in the right direction to re-equip. While new planes may increase subsidy temporarily, it's a transition necessary to local service air transportation. Major consideration in CAB's underwriting of Mohawk's mixed Convair-DC-3 fleet (nine of 11 Convairs were allowed for mail rate purposes, the other two being declared in excess) was the gradual manner in which they were introduced on routes.

Other important actions in the order: (1) rate of return on investment was boosted from 8% to 9.5%, and same will apply to all locals at least until a decision in Board's Local Service Rate of Return Investigation; (2) allowable limit on executive salaries for locals was upped from \$20,000 to \$25,000 a year.

The International Air Transport Association

(IATA) was not associated with the International Civil Aviation Organization in ICAO's recent study of "the Economic Implications of the Introduction Into Service of Long-Range Jet Aircraft," although a Transport Airtrend in the August 25 issue of AMERICAN AVIATION could be interpreted to mean the report was a co-operative effort.

Actually, IATA has been distressed over some of the unsupported conclusions drawn by ICAO's staff in its unimaginative report. It is not true, both IATA and international airline officials insist, that there will be a great surplus of available seats when the jets are introduced. This dire possibility—predicted by the ICAO report—can only come about if two very unlikely events happen: First, that none of the present fleet of piston-engine aircraft are sold or scrapped and, second, that none of the airlines makes any effort to develop new jet-age traffic.

IATA is greatly concerned over the dismal tone of the ICAO report, and the bad effect it is having, both among governments which try to control load factors, and among members of the financial community who are being called upon to help raise the money to pay for the new jets. IATA believes the ICAO report should not go unchallenged, and is encouraging its members to rebut it whenever they can.

U.S. airlines toeing the threshold of jet service are faced with the most difficult labor crisis in their history.

A wrong decision or concession could mean financial ruin; grounded jets, at \$5 million each, could be just as disastrous.

Air Line Pilots Association, the labor group calling the shots, holds the most powerful bargaining wedge yet to come its way.

Here's why. Pan American World Airways, first on the jet parade, is due to start 707 service in November. A flight engineer contract has been signed, but PAA has no pilot contract. It expired several months ago. Jet "shakedown" flights are using supervisory pilots; subsequent promotional and proving flights may have to do likewise.

Next, American Airlines. Also has flight engineer contract but no pilot agreement. It expired more than a year ago. Reason for non-renewal, jet pay and flight engineers.

Eastern Air Lines. Pilot contract signed but expires soon after jets enter service. But pilot agreement has heightened threat of engineer walkout.

Trans World Airlines. Not settled, but jet service still six to eight months away. Flight engineer contract signed. Pilot contract expired recently.

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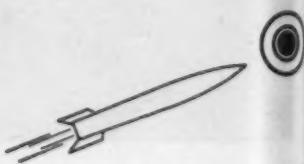
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Exclusive:

How IATA Curbs the Maverick Lines

This story of the successful enforcement of international airline tariff agreements is an **AMERICAN AVIATION** exclusive. Until now the work of the International Air Transport Association in this field has been a carefully guarded secret. IATA has understandably wanted to protect the carriers who were accused of violations. The editors of **AMERICAN AVIATION** want to emphasize that the information used did not come from IATA sources.

By Robert Burkhardt

Transport Editor

When it comes to drawing up international agreements, getting all parties to sign, and then policing the agreements and cracking down hard on the violators, the International Air Transport Association can teach a thing or two to the United Nations.

These crackdowns have already cost the offending airlines the somewhat shocking total of \$663,000.

Like the UN, IATA was born of the farsighted belief that the postwar period was going to give rise to many complex and potentially dangerous international problems. Meeting at Havana in 1945, the international carriers formed IATA as "a cooperative organization of the world's airlines . . . the agency through which some 70 companies of many nationalities work to knit their individual routes into an international air transport system, along whose every mile there will be the same high standards of safety, economy, efficiency and service to the public."

One of the most pressing problems facing IATA members was obtaining general agreement on international fares and procedures, and then getting everybody to abide by their agreement. This still is a very thorny problem, for many of the 72 IATA members are government-owned and most of the others are subsidized by their governments.

Device used by IATA to curb those maverick lines that cannot resist the temptation of rate-cutting is the "Breaches Commission." These are three-man courts appointed by the association's director-general to hear complaints of non-compliance with IATA traffic regulations and assess penalties against those found guilty.

These commissions have the power to levy fines of as much as \$25,000, issue "primands," and, in extreme cases, expel the offender from the association. Just recently IATA appointed its 20th

Breaches Commission, and a hearing session was held in New York a few weeks ago on a dozen or so complaints. Procedure calls for the Commission to be chaired by a person with legal training, with the other two members appointed from traffic officials of member airlines.

Usually there are three days of hearings, with the accused represented by counsel who may introduce evidence and otherwise see that both sides of the complaint are made known to the Commission. After the hearings, which are not open to the public, though any interested IATA member may have an observer present, the Commission spends two or three more days making its decisions on the cases.

These decisions are then written up as a report to the Executive Committee and the director-general of IATA. Carriers have the right to appeal the rulings of the Breaches Commissions, but only on the basis of new evidence discovered after the hearing was held. In actual practice, the airlines base their appeals on a liberal interpretation of "new evidence," hoping to obtain a reversal on the facts already presented.

This has become so widespread that IATA Director General, Sir William P. Hildred, took occasion last December at the general meeting in Madrid, to point out that the number of applicants seeking reconsideration of a Breaches Commission decision "amounts to quite a high proportion." It is wasteful for IATA to have to process these vain efforts to obtain a reversal, Sir William said, for "in the majority of applications the Executive Committee could find no justification for reconsideration."

• **Cost of enforcement high**—Sir William pointed out that the costs of enforcing the traffic agreements now amount to more than \$200,000—nearly a fifth of IATA's annual budget. "Most difficult areas are the Middle East and the lower latitudes of South

America," BOAC's J. R. McCrindle, chairman of the Permanent Enforcement Subcommittee, reported at the Madrid meeting.

Major McCrindle gave no details of the extent of the enforcement problem, nor did he drop any hints as to the particular carriers giving the most trouble. He did say, however, that because of the growing number of complaints involving the Middle East the Enforcement Office had found it necessary to make a special investigation of the traffic resolutions affecting this area. The results are now being studied by the IATA traffic conferences.

At the start of IATA's enforcement work, it was thought that the agreements would be self-policing: a carrier would see a violation by a competing airline, file a complaint with IATA, present evidence at the Breaches Commission hearing, a ruling would be made and that would be that. It very quickly became evident that airlines, for competitive reasons, were reluctant to file complaints against one another.

Some were filed, and in a number of cases these resulted in fines being assessed. More and more the burden of investigation and the job of prosecuting the complaint before the Commission fell to the lot of IATA's chief enforcement officer and his staff.

• **How complaints are brought nowadays**—Today almost all complaints are brought by IATA's own enforcement officials, although in almost every case the basis for the complaint was information supplied to the enforcement officer by a competing airline. There are cases where an IATA enforcement agent appears to have made the complaint as a result of independent investigation, but these are rare.

An IATA enforcement officer was riding a KLM mixed-class flight between Amsterdam and Rome, for example, and observed:

1. The curtain used to separate first class from tourist was left open throughout flight.
2. The galley was not separated in any way from the tourist class apartment.
3. It was necessary for female tourist class passengers to pass through the first-class compartment to reach the toilet facilities.

(Continued on page 58)

—TRANSPORT AVIATION—

KLM could have obtained an exception from IATA to agreements covering tourist and first-class configuration, but failed to do so. Result: \$1,000 fine.

Peanuts case not peanuts—KLM also found out that even peanut violations can bring \$1,000 fines. When they gave away "peanut sets" with the notation "made especially for KLM" on the bottom of the saucers, a complaint was filed with IATA because they cost more than the 25¢ maximum allowed for gifts to sales agents.

KLM said peanut sets were a mistake they wouldn't make again, but the Breaches Commission assessed the fine just the same. It is this kind of oversight that has put KLM third among those carriers found violating the IATA agreements, with more than \$70,000 assessed, plus two reprimands.

Panair do Brasil (half-owned by Pan American) has the dubious distinction of leading the list of violators with \$103,000 in fines. Actually, Panair does not have as many violations as some of the other carriers, but the total of fines is higher because of two \$25,000 fines and one for \$26,000.

The \$26,000 fine might seem to be in excess of the maximum, but it was levied for 13 violations—\$2,000 fine for each—of the agreement on exchange rates. In this particular case, the Breaches Commission observed that "competition for traffic between Europe and points in North and South America is intense."

"The grant of what amounts to a 9% rebate to such a large number of persons cannot be dismissed as a clerical error," the Commission ruled. "Such practices, if permitted to continue without severe penalty, in our opinion, would undermine and nullify the entire IATA fare structure."

American Airlines and United, at the other extreme, received their \$500 fine along with six other carriers who

were too lavish in their hospitality at a San Francisco convention of travel agents. Each of the airlines had a "hospitality suite" for the agents, and IATA ruled that type of general entertainment violated the basic agreement to limit members in their efforts to win friends and influence sales agents.

More than half the carriers in IATA have thus far escaped any penalties or reprimands. In the case of some of the larger international lines, such as Eastern Air Lines and Qantas Empire Airways, Ltd., their apparent virtue is probably a combination of careful management control plus good luck, for the IATA agreements are complex, detailed documents and unintentional violations must occur frequently despite the most careful efforts to operate by the book.

Summary of IATA Fines

Carrier	Total Fines
Panair do Brasil	\$103,000
Air France	94,150
KLM Royal Dutch Airlines	70,650
Scandinavian Airlines System, Inc.	46,950
EI Al Israel Airlines	45,700
Pan American World Airways	45,350
Braniff Airways	38,000
Linee Aeree Italiane	32,500
Canadian Pacific Air Lines	28,000
Pan American-Grace Airways	25,800
Iberia	19,800
Alitalia	18,000
Union Aeromaritime de Transport	12,500
Varig	12,500
Swiss Air Transport Co., Ltd.	12,300
British Overseas Airways Corp.	10,650
Sabena Belgian World Airlines	10,100
Linea Aeroposta Venezolana	8,800
Misrair	7,000
Air Liban	4,400
Hunting-Clan Air Transport, Ltd.	3,500
Northwest Airlines	2,000
British European Airways Corp.	1,800
Trans-Canada Air Lines	1,750
Trans World Airlines, Inc.	1,600
Iraqi Airways	1,000
Lufthansa	1,000
Aerolineas Argentinas	1,000
Japan Air Lines	1,000
Transportes Aereos Portugueses	1,000
American Airlines	500
United Air Lines	500
Chicago & Southern	200
Grand Total	\$663,000

• Baggage cases common—Failure to collect for excess baggage is a common problem on all airlines, domestic as well as international. Yet fines imposed by various of the IATA breach commissions have ranged from reprimands to fines as high as \$15,000. According to the record, this was the fourth most common breach of the agreements.

One of the IATA agreements provides that if a sales agent does not remit promptly for tickets sold, his delinquency must be reported to the appropriate IATA traffic conference without delay after lapse of the specified period of grace. Failure to report a delinquent agent is a violation of the agreement, and this was the most common breach. Perhaps for this reason, the usual fine for failure to report a delinquent agent is \$500.

The North Atlantic "battle of the sandwiches" earlier this year received a lot of newspaper attention (and resulted in imposition of at least one \$25,000 fine) but the problem of overgenerous treatment of tourist passengers has been a continuing problem, and is likely to be more so now that an "economy class" service has been added to the usual first class and tourist. Nearly a dozen of the IATA members have been either reprimanded or fined for this offense, with the fines usually less than the \$25,000 levied earlier this year.

Another very common offense is granting a student discount to someone not eligible. The rules are quite explicit, and a 40-year-old part-time student taking a course in typing is definitely not entitled to a reduced fare. A less common problem arises with family discounts, particularly where one member of the family breaks out and makes a separate side trip. Fines assessed in these cases seldom are more than \$1,000.

By contrast, a carrier that fails to apply the appropriate rate of exchange, and thus in effect gives the customer a discount, can arouse the ire of a Breaches Commission to the point where very stiff fines of from \$5,000 to \$20,000 are imposed. (It may be of interest to point out that there have been no cases where a carrier was fined—or even accused of—overcharging a customer.)

Instances of carriers granting straightforward discounts are rare, judging from the reports of the breaches commissions. Where they do occur, the IATA enforcement staff usually employs someone to buy the ticket to be used in evidence, and then checks a few days afterwards to see how the transaction was handled. A cover-up

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entry is usually made, and this very damaging evidence often results in a very stiff fine indeed.

Most of the breaches investigated involve passenger service or some over-generous treatment of travel agents and others authorized to sell tickets for more than one carrier. These offenses may range from doing business with a non-IATA approved agent (usual fine: \$2,000) to giving a free ride to someone not entitled to it (fines of \$200 to \$5,000).

• **Cargo violations growing**—There are also violations of the cargo agreements, and these are growing in number as the volume of cargo increases and the tariffs grow in complexity. One ironic violation that has tripped up several airlines is accepting a passenger ticket from an agent who is authorized to solicit cargo business only. Violations of the cargo agreements are not treated lightly, however. Fines for cutting the tariff have ranged up to \$15,000 and in one case a \$10,000 fine was imposed for failing to note rates and charges on a waybill.

All in all, the airlines are remarkably free from error, considering the volume of traffic handled and the many language and tariff complications to deal

with on an immediate decision basis. At the present time, IATA members serve more than 50 different countries over more than 500,000 route miles.

Great strides are being made in simplifying procedures and in what IATA calls "facilitation"—meaning, let's make it easier to move people and things by persuading governments to cut red tape, such as passports, visas, head taxes, etc., and cutting our own paperwork requirements to the minimum. With less fine print in the agreements, and better trained and experienced personnel, the number of innocent errors should drop to a minimum, though amount of enforcement work necessary will very likely increase under the impact of increased competition for international traffic.

Much credit for the success of IATA's breaches investigation work must go to Rudolph Feick, chief enforcement officer, and his highly respected professional staff of nine. They are the "teeth" in the IATA agreements and it is their skill and efficiency that helps keep violations to a manageable level.

If the United Nations ever adopts the idea of a standing international police force to keep order among the

small states, they would be wise to consult Feick; perhaps even to hire him to run the force. Would the Soviets approve? So far Aeroflot, the Red flag line, does not belong to IATA and this has unquestionably made the enforcement job easier.

There have been repeated rumors that Aeroflot would like to establish international service to and from the United States eventually, but under what circumstances it would do so has never been made clear.

On the other hand, both the Czech and Polish airlines (as well as the Yugoslav line) are IATA members. As Aeroflot presses ahead with plans for a London-Moscow service, and begins to consider what concessions will have to be granted to obtain U.S. traffic rights, there is a good chance that an application for IATA membership may be submitted.

This would meet with prompt acceptance, of course. But would the Soviets cooperate fully in all the IATA programs and agreements? Only the future—and the yet-to-be-appointed breaches commissions—can supply the answer. Meantime the enforcement program is working, and working well, unhampered by a veto or "nyet."

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—STATISTICS—

Summary of U.S. Airline Traffic for June 1958 vs. June 1957

Compiled by American Aviation Publications from Official CAB Data

	Revenue Passengers			Revenue Passenger Miles (In Thousands)			Total Ton-Miles Rev. Traffic			% Available Ton-Miles Used	
	1958	1957	% Change	1958	1957	% Change	1958	1957	% Change	1958	1957
DOMESTIC											
American	466,619	708,331	+5.93	477,444	503,286	-5.13	55,813,728	57,673,567	-3.22	59.5	61.1
Brannif	172,199	177,423	-2.94	76,002	79,977	-4.99	8,284,461	8,542,018	-3.24	49.3	50.1
Capital	348,754	371,659	-6.11	140,422	146,437	-4.36	14,613,900	14,953,473	-2.27	58.1	58.5
Continental	74,363	74,605	-0.32	37,579	35,117	7.01	3,112,375	3,132,119	7.72	40.5	38.4
Delta	226,955	231,249	-1.86	113,191	113,873	-0.60	12,483,610	12,242,819	1.97	53.4	46.7
Eastern	649,377	672,338	-3.42	347,953	365,739	-4.89	35,883,405	36,087,821	-5.79	40.3	47.3
National	110,402	114,287	-3.22	45,511	49,580	-9.85	7,084,184	7,473,522	-5.21	44.2	36.5
Northeast	83,598	71,254	17.46	30,272	20,502	47.46	3,047,083	2,055,421	49.22	36.3	49.5
Northwest	148,216	138,560	8.54	115,381	102,515	12.55	12,517,796	11,242,079	11.34	51.7	51.7
Trans World	423,345	435,712	-2.84	370,073	368,118	0.53	39,195,038	39,122,149	0.19	61.4	65.5
United	622,736	694,131	-4.81	463,535	465,506	3.87	54,413,562	52,408,031	3.43	59.7	43.5
Western	56,199	124,455	-54.84	30,976	66,023	-53.08	3,211,802	6,080,489	-53.32	42.3	46.2
TOTALS	3,583,265	3,712,006	-3.47	2,288,239	2,335,492	-2.03	250,481,245	254,534,508	-1.59	54.5	58.8
TERRITORIAL											
Caribair	18,525	16,570	11.80	1,312	1,177	11.47	137,290	126,635	8.41	60.2	57.3
Hawaiian	39,625	41,737	-5.06	6,061	6,304	-3.86	628,821	649,126	-6.02	57.4	46.7
Trans Pacific	18,303	17,635	3.79	2,442	3,028	-19.35	203,686	252,343	-19.28	63.7	61.9
TOTALS	76,453	75,942	0.67	9,815	10,309	-6.60	969,777	1,048,104	-7.47	59.0	60.3
INTERNATIONAL											
American	9,882	11,921	-17.10	8,584	8,332	3.02	1,199,502	1,195,324	0.35	50.4	44.3
Brannif	4,204	4,148	1.35	8,011	9,138	-12.33	964,965	1,087,877	-11.30	47.0	50.2
Delta	4,571	5,769	-20.77	6,173	7,580	-18.56	724,508	904,020	-19.84	48.7	39.5
Eastern, Overseas	37,780	31,945	18.64	51,242	42,642	20.17	5,445,958	4,567,624	19.67	58.8	42.7
San Juan	24,338	26,879	-2.01	39,707	38,627	2.80	4,212,062	4,149,341	1.51	62.5	43.7
Bermuda	8,011	4,964	61.32	6,249	4,015	55.64	642,814	418,283	53.48	51.1	54.2
Mexico	3,431	.....	.....	5,294	.....	.....	610,982	.....	.....	47.0	.....
National	6,567	6,497	1.08	4,832	4,563	5.68	576,782	525,269	9.81	49.0	45.5
Northwest	15,105	11,784	28.16	34,571	25,862	33.67	5,338,557	4,547,026	22.81	67.7	71.4
Hawaiian	1,966	1,384	41.85	5,275	3,675	43.54	588,767	410,948	43.27	75.5	69.2
Panagra	7,982	11,487	-13.99	11,908	14,329	-16.70	1,752,268	1,891,054	-7.34	51.7	57.4
Pan American, System	247,328	258,679	-4.39	388,305	402,461	-3.52	49,483,243	49,751,391	-0.55	44.3	45.4
Latin America	97,641	107,099	-8.83	113,175	122,772	-7.82	15,098,350	15,261,432	-1.07	64.2	43.5
Atlantic	120,443	115,076	4.66	179,983	168,274	6.76	21,917,542	20,452,052	7.17	60.4	45.5
Pacific	23,683	27,149	-12.77	88,684	101,225	-12.39	11,488,081	12,443,551	-8.10	74.0	68.5
PDX/SEA-HON.	1,365	1,992	-31.48	3,765	5,542	-32.06	427,070	407,530	-29.70	52.4	40.1
Alaska	5,561	9,355	-40.56	6,463	10,190	-34.58	82,270	1,362,354	-40.01	50.5	37.1
Trans Caribbean	7,926	.....	.....	16,181	.....	.....	1,444,452	1,444,452	.....	81.1	.....
Trans World	35,166	31,868	10.35	100,520	87,537	14.83	11,951,894	10,481,107	13.95	54.4	47.4
United	11,629	11,897	-2.25	29,068	29,543	-1.61	3,192,209	3,174,288	0.57	67.8	69.3
Western	702	.....	.....	1,091	.....	.....	121,561	.....	.....	27.2	.....
TOTALS	390,742	385,899	1.25	660,476	631,987	4.51	82,216,099	77,940,980	5.49	61.6	65.5
LOCAL SERVICE											
Allegheny	44,830	44,140	1.56	7,863	7,721	1.84	798,647	777,181	2.76	48.9	47.2
Bonanza	14,961	12,235	22.28	3,441	2,672	28.78	343,581	248,930	27.76	42.9	45.5
Central	11,754	11,634	1.03	2,246	2,340	-4.02	229,983	234,851	-2.95	30.7	35.6
Frontier	20,804	19,855	4.78	5,538	5,254	5.37	469,615	593,176	2.77	58.2	42.2
Lake Central	14,714	N.R.	.....	2,347	2,286	2.47	240,760	236,324	2.31	40.3	41.8
Mohawk	39,836	38,586	3.24	7,582	7,341	3.29	799,052	744,947	1.62	51.8	50.6
North Central	67,945	63,979	6.23	11,073	10,581	12.21	1,198,583	1,045,927	12.45	48.9	50.6
Ozark	36,279	38,195	-4.96	6,114	6,289	-2.78	621,135	646,763	-3.96	47.7	46.1
Pacific	32,947	30,902	6.62	7,352	6,584	11.44	723,103	649,207	11.38	51.6	57.4
Piedmont	37,408	39,854	-4.14	7,863	8,524	-7.75	793,434	855,694	-7.28	55.1	40.7
Southern	18,309	19,277	-5.02	3,341	3,479	-3.57	341,866	352,587	-3.04	38.2	40.1
Trans-Texas	19,482	21,718	-10.30	4,351	5,083	-14.40	443,582	526,783	-12.00	38.5	41.2
West Coast	22,212	24,551	-7.53	4,064	4,358	-6.70	404,552	429,036	-5.49	47.4	51.8
TOTALS	381,521	364,926	4.55	73,977	72,514	2.02	7,527,812	7,383,405	1.95	47.5	49.4
HELICOPTER SERVICE											
Chicago	9,101	5,405	68.42	164	80	106.00	17,028	10,201	45.94	28.2	34.1
Los Angeles	3,335	2,805	18.89	124	102	21.57	17,984	14,558	23.53	42.7	43.1
New York	8,763	7,214	21.47	159	131	21.37	17,645	15,927	10.79	47.1	43.8
TOTALS	21,199	18,424	37.44	447	313	42.81	52,657	40,686	29.42	41.6	43.8
ALASKAN											
Alaska	6,237	5,878	6.1	3,421	3,654	28.9	678,944	646,642	1.8	44.4	45.1
Alaska Coastal	6,363	5,865	8.0	539	499	8.0	63,716	58,638	8.7	61.2	61.2
Cordova	1,040	2,105	-50.6	169	1,168	-95.5	37,575	391,002	-90.4	44.2	44.0
Ellis	5,695	7,247	-21.4	321	380	-15.5	37,701	43,594	-13.5	45.4	44.8
Nor. Consolidated	2,428	2,782	-12.7	744	867	-14.2	174,322	201,136	-13.3	61.9	63.7
Pacific Northern	1,528	12,733	-1.6	12,155	13,596	-10.4	1,672,480	1,886,684	-11.4	66.0	67.6
Reeve	1,178	1,140	3.3	860	870	-1.1	176,092	137,858	27.7	58.5	48.2
Wien	2,983	3,800	-21.5	1,154	1,257	-8.3	284,940	405,670	-29.8	50.3	57.8
TOTALS	38,472	41,550	-7.4	19,363	21,295	-9.1	3,125,770	3,791,224	-17.6	57.6	59.4

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At an Air Transport Association reception and movie showing in Miami, WWP gets posed with a couple of comely Eastern Air Lines' stewardesses.

Avocation Avidity or Horsing a Hobby

Let me report a good example of how I work overtime trying to complete my goal of hitting every airport in the U.S. served by a scheduled airline. Last March I had to go to West Palm Beach, Fla., on business, but instead of taking a nonstop in three hours and a half I took a day and a half and many hundreds of miles out of my way. But I have now completed both the National and Piedmont systems and reduced remaining Southern Airways stops to two, and Delta to one. I hit nine new airports going and coming, and three months later hit three more.

A noon American Airlines flight took me to Memphis. I transferred to a Delta DC-3 for Jackson, Miss., by way of Greenwood, Miss., a new stop. At Jackson I had time for a hamburger in that fine little restaurant at the airport with Perry Wingo, d.s.m. for Southern Airways, and Frank Wignall, an 18-year safety veteran of CAA.

At dusk I took off in a well-filled Southern DC-3 for Laurel, Miss., a new stop, where I was greeted by Troy Davis, station manager, and headed on through thunderstorms and lousy weather to Gulfport-Biloxi, also a new stop, and thence on to Mobile for the night. I flew with Capt. W. M. Green, 1st Officer G. B. Meares, and a stewardess by name of Miss Hunter whose southern accent could be cut up and sold in solid chunks.

At Mobile, old friend Casey Britt, who left Capital to become v.p.-sales of Southern several years ago and is doing fine in his new spot, was waiting to take me into town for a late dinner. In a torrential downpour we drove to the Battle House, one of those few southern hotels with old-time atmosphere, and we foregathered at a never-closed restaurant across the street by name of Constantine's for a steak dinner and good industry shop talk.

• "En Route" interviewed en route—Up early next morning, I was picked up and driven to Bates Field (and interviewed en route) by Vivian Cannon, aviation editor of the *Mobile Press-Register*. She is a young reporter from an old school—she gets her facts right. After one of the worst cups of coffee on record at the airport cafe (which could be toned up considerably) with Lawrence Murray, National's station manager, I boarded a National Convair bound for Jacksonville, Fla., via a lot of stops including two new ones, Panama City and Marianna. Capt. George Wydetic was on instruments every mile of the way—the weather was really goshawful—and so we arrived an hour late in Jax.

Jesse Johnston, a National special pas-

senger rep, broke the news to me that my connecting southbound Eastern flight had left on time, but he had protected me on an NAL Convair going to Tampa where I could wait for a couple of hours and get another NAL Convair to West Palm Beach. So in five hours I crossed the State of Florida three times and finally got to West Palm about midnight. Jim Tilford, NAL's manager at WPB and one of the hardest-working airline men I've ever known, had lined up a motel room for me. I was plenty tired but I had five new airports under my belt.

Coming north I picked up four more on Piedmont by taking a National Convair to Wilmington, N.C. and transferring. I had a couple of hours to spare and was royally entertained by Don Rowell, NAL's station manager (who has since transferred to Norfolk) and David O. S. Ruark of the Chamber of Commerce (he is a brother of columnist and author Bob Ruark). I was taken on a nice tour of the town, with its tree-covered streets and fine old homes, and even visited a nearby plantation.

• Doing it the hard way—By National it's only a couple of hours at most from Wilmington to Washington, but I chose a six-and-a-half hour route over Piedmont via Tri-Cities Airport at Bristol, Va.-Tenn. It took three separate flight segments, but I hit four new stops: Fayetteville, Southern Pines-Pinehurst-Aberdeen and Hickory, all in North Carolina, and Charlottesville, Va. In addition, I also got my first look at the fine new terminal at Charlotte, N.C.

Old-time passengers will recall that Tri-Cities Airport, serving Bristol, Johnson City and Kingsport, where Virginia meets Tennessee, was an essential stop on American's first transcontinental route. For a time every flight stopped there. American has long since pulled out, but today this airport is a big hub for Piedmont, with somewhere between 25 and 30 flights per day coming in and out. This junction has more service now than it ever dreamed of having when it was on AA's route.

Instead of a direct round-trip of 1,720 miles to WPB, my trip came to 3,353 miles. But it was worth it.

Finally on June 16, three months later, I managed to hit the last remaining three stops on Piedmont, completing the system. I was driving to Florida, so on a hot, humid Sunday morning I headed for Kinston, N.C., to park my car at the airport and fly via New Bern to Morehead City, N.C., a seasonal stop, and back to Kinston, also new.

• Some rough moments—There were a few moments when I didn't think I'd see Morehead City on this trip. The thunderstorm activity was extremely heavy and, while I was in Kinston, a near-tornado struck just south of town. Piedmont Station Manager Glen Smith kept me informed of the Eastbound flight while I waited in the hot little wooden terminal. An hour late, Capt. Lee Gaither, an 11-year Piedmont vet, pulled in with his DC-3 after bucking storms all through West Virginia and North Carolina.

We got to New Bern okay, but the Kinston storm had moved on east and seemed to be right over the coast town of Morehead City, end of the line. At one time Capt. Gaither decided to turn back. Then he learned there was almost a full plane-load of passengers waiting at Morehead so, after waiting awhile and re-checking the weather several times, we took off on a round-about route for the coast. We got in without a ripple, the storm center having moved away by this time.

That's interesting country, the North Carolina coast. Inlets, bays, islands, fishing towns, swamps, rich farm land, beaches. Like to see more of it.

Back in Kinston I got in the car and headed nonstop to Wilmington, arriving at the airport just in time to meet a National Convair from Washington to pick up Len Eiserer of AAP, who was joining me for the drive south. We spent the night at the Cape Fear Hotel and next morning drove to the airport. Eiserer took my car and headed south to Myrtle Beach. I waited for the late morning flight from Wilmington to Myrtle Beach, paid my respects to Bob Lipscomb, Piedmont station manager, whom I had seen in March, and was ticketed by Levy Heath.

At 11:30 a.m. I took off with Capt. Gene Smith for a fine 90-mile flight down the Carolina coast. I was surprised at the growth of the resort areas, especially Myrtle Beach. Purser Ray Sullivan kept me supplied with Cokes, which are served year-round now on Piedmont. As our DC-3 pulled up at the Myrtle Beach terminal, Eiserer was just driving into the airport. Out of plane into car, I continued the drive south to Florida, having cleaned up every new airport south of Pennsylvania and east of Atlanta.

Piedmont's going to miss my business—I've traveled many hundreds of miles covering the entire system—but president Tom Davis says they'll be getting some new stops soon. If and when this happens, I'll be ready for another trip. Piedmont is a well-run carrier, one of the best in the business.



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Shelby M. Kritser, president (right) and Robert E. (Bob) Siler, secretary and general manager of Tradewind Airport, Amarillo, Tex.



Tradewind's facilities include 4 large hangars and 30 T-Hangars which will accommodate 120 planes.

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